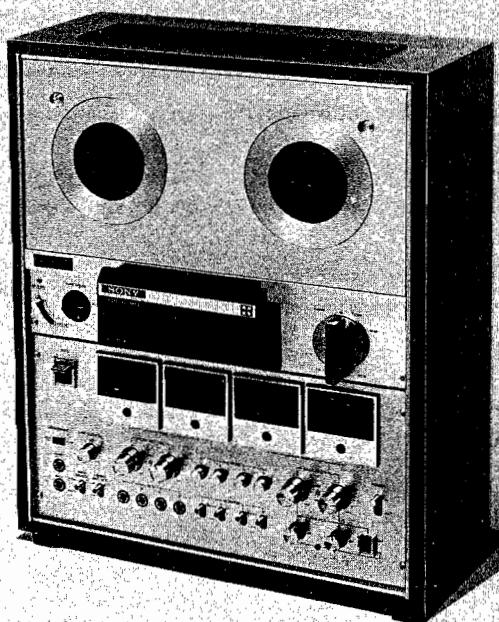


TC-388-4

USA Model
PX Model



4-CHANNEL STEREO TAPECORDER

SPECIFICATIONS

Power Requirements:	120 V AC, 60 Hz (USA Model) 120 V AC, 60 Hz (100, 110, 127, 220, 240 V AC, 50 Hz adjustable by the Sony personnel) (PX Model)	Wow and Flutter:	0.09 % at 19 cm/s (7½ ips) 0.12 % at 9.5 cm/s (3¾ ips)
Power Consumption:	40 W (USA Model) 32 W (PX Model)	S/N Ratio:	55 dB with Sony SLH tape
Tape Speed:	19 cm/s (7½ ips), 9.5 cm/s (3¾ ips)	Inputs:	Microphone inputs 4 Sensitivity 0.2 mV (-72 dB) Accept low impedance microphones
Recording Time:	45 min. at 19 cm/s (7½ ips) quadrphonic recording with 1,800 ft tape		Line inputs 4 Sensitivity 0.06 V (-22 dB) Impedance 100 kΩ
Reels:	17.8 cm (7 inches) or smaller	Outputs:	Line outputs 4 Output level 0.775 V (0 dB) at load impedance 100 kΩ with line output volume control set to MAX Suitable load impedance higher than 10 kΩ
Recording System:	4-track quadrphonic, stereo and mono system		Headphone outputs 2 Accept an 8Ω stereo headphones
Frequency Response:	With Sony SLH tape 20 ~ 30,000 Hz at 19 cm/s (7½ ips) 20 ~ 23,000 Hz (± 3 dB) at 19 cm/s (7½ ips) 30 ~ 19,000 Hz at 9.5 cm/s (3¾ ips) With standard tape 20 ~ 25,000 Hz at 19 cm/s (7½ ips) 30 ~ 17,000 Hz at 9.5 cm/s (3¾ ips)	Dimentions:	422 (w) x 505 (h) x 220 (d) mm 16⅝ (w) x 19⅞ (h) x 8⅓ (d) inches
Distortion:	1.2 %	Weight:	14.5 kg (31 lb 14 oz)

SONY
SERVICE MANUAL

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When ordering replacement parts, use PART NUMBERS listed in Parts Lists or shown in EXPLODED VIEWS.

Parts List reference numbers should not be used.

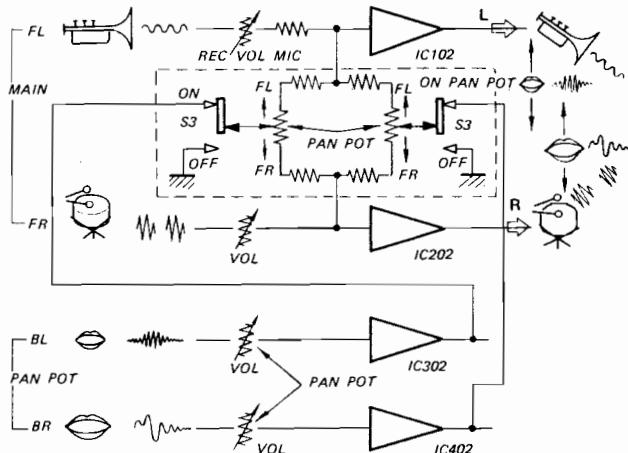
**FL: FRONT L-CH
FR: FRONT R-CH
BL: BACK L-CH
BR: BACK R-CH**

SECTION 1

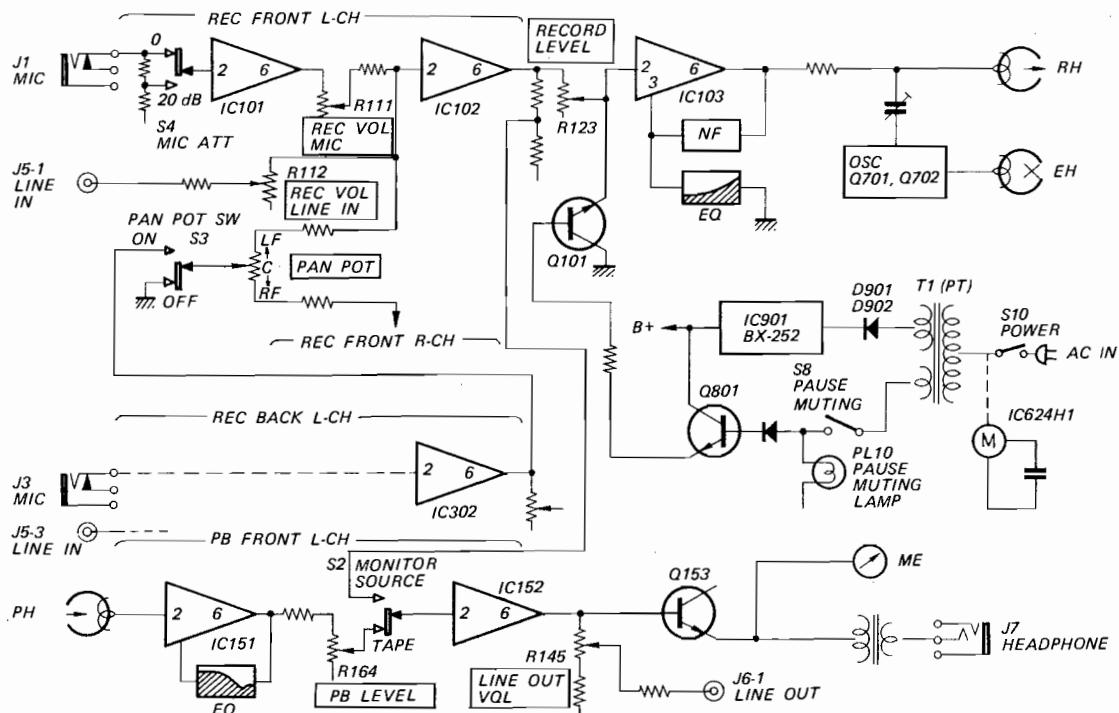
OUTLINE

1-1. PAN POT (Panoramic Potentiometer)

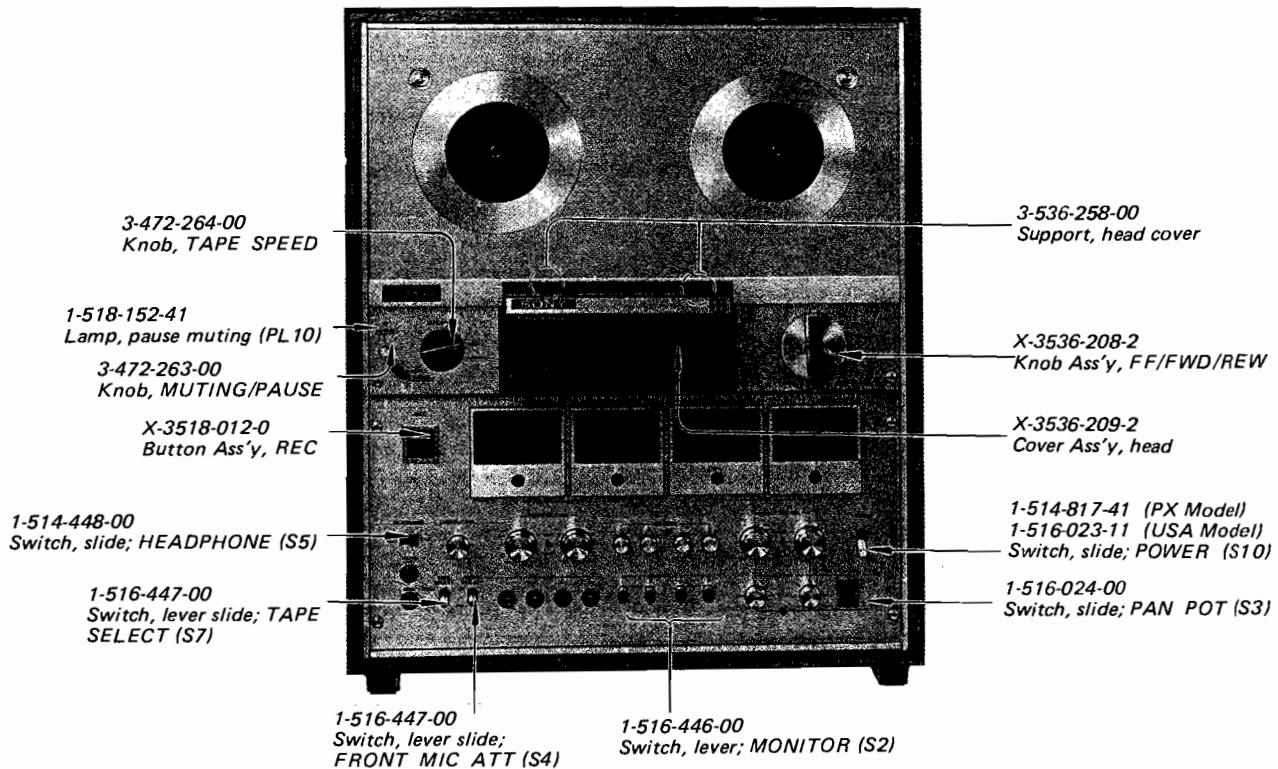
With PAN POT switch turned ON, the BACK channels are mixed into the FRONT channels to reproduce the two-channel stereo sounds and PAN POT controls can shift a sound image on a reproduced stereo sound field. The two FRONT channels are used for reproducing a stereo sound field and the two BACK channels for reproducing a sound image and shifting it.



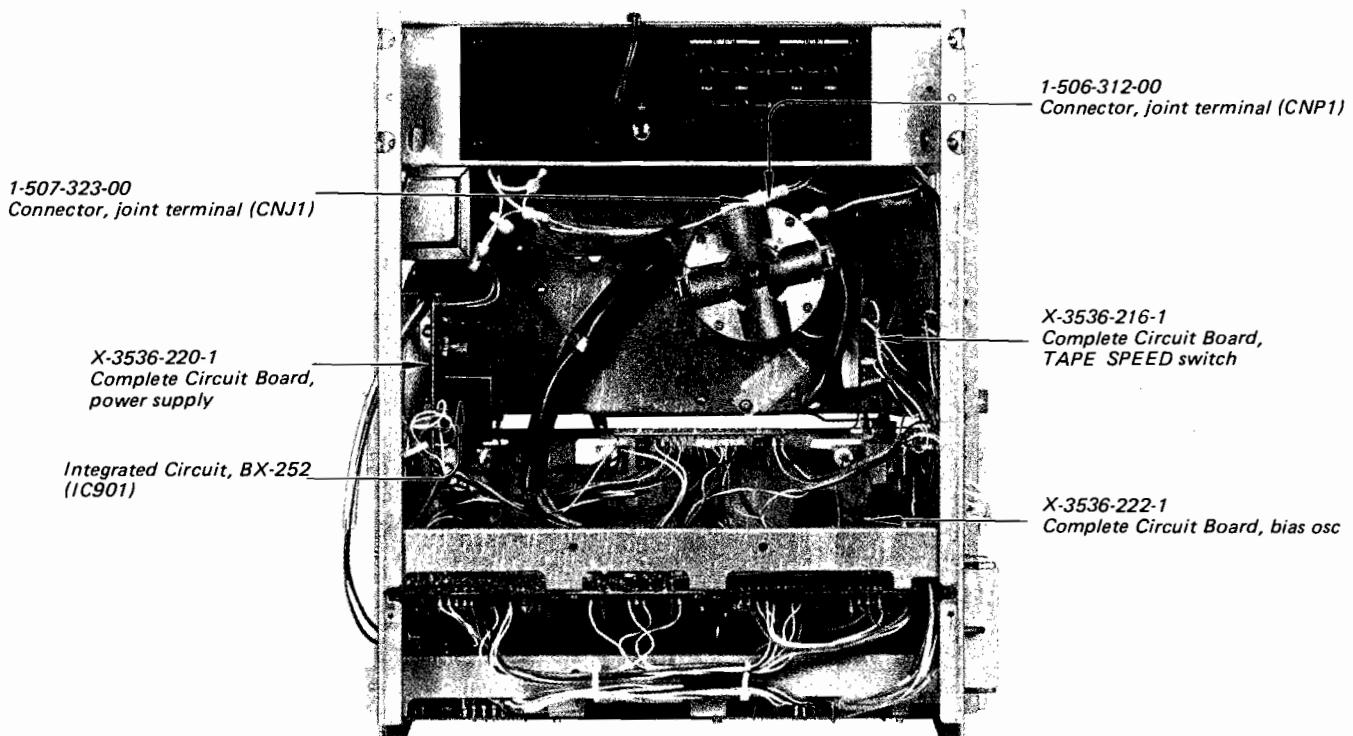
1-3. BLOCK DIAGRAM

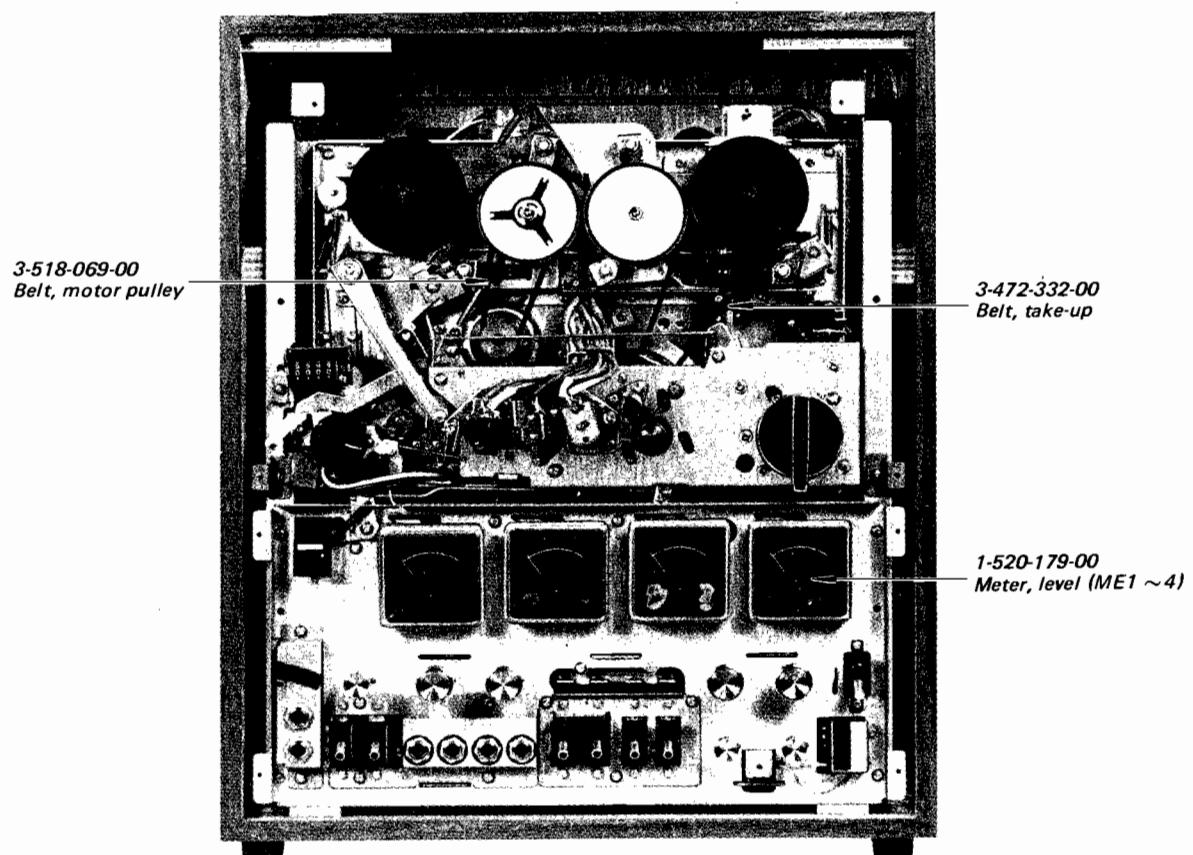
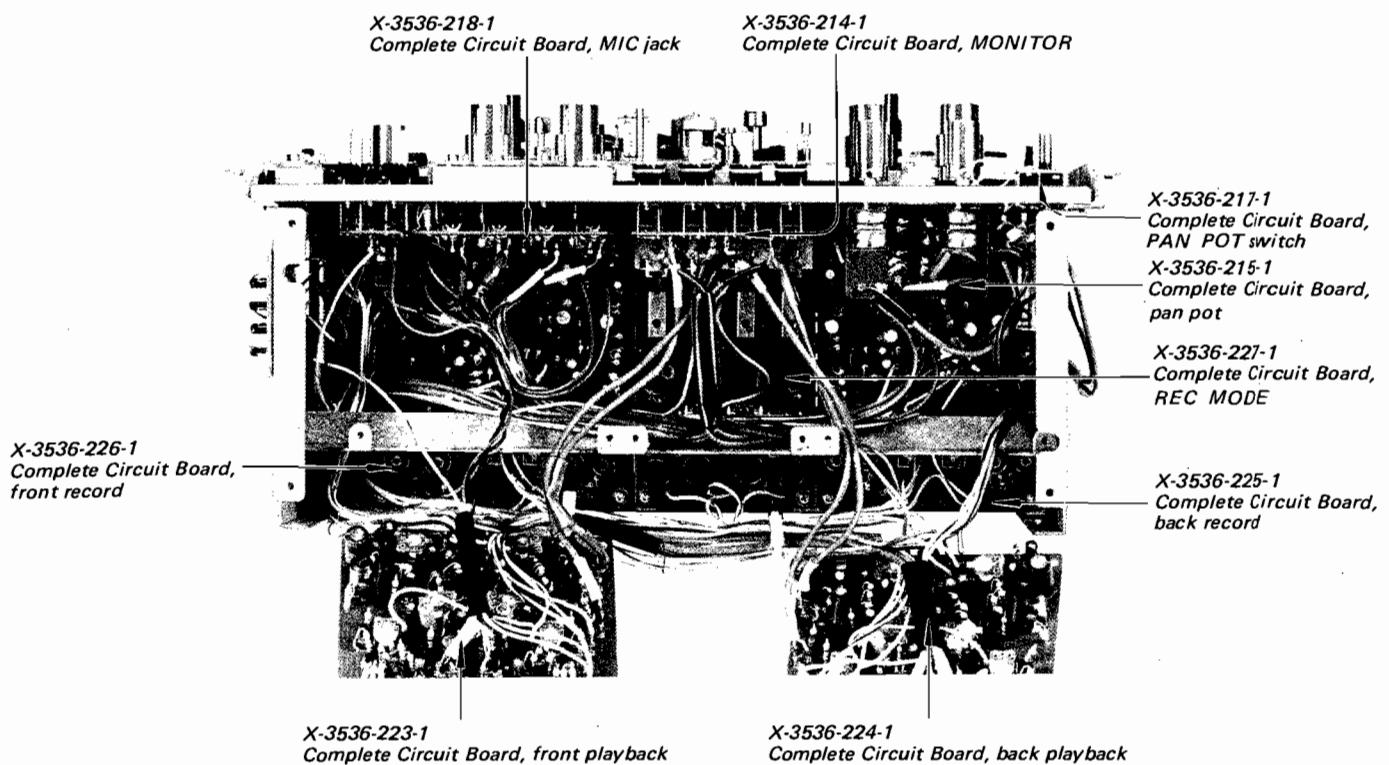


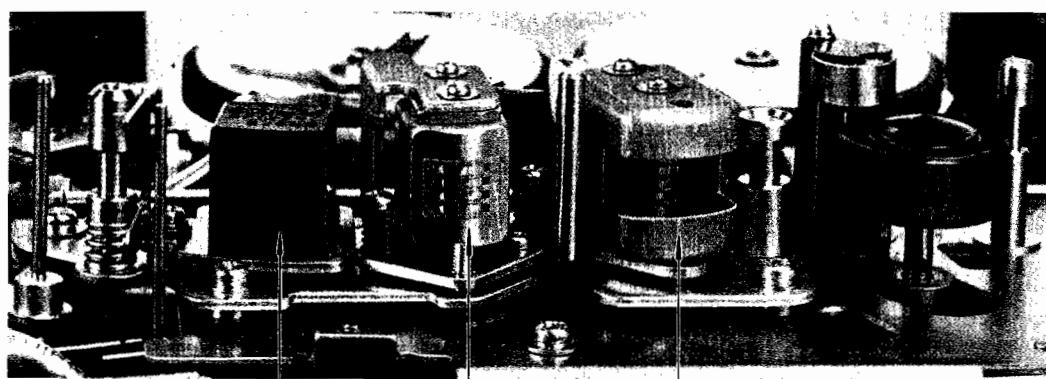
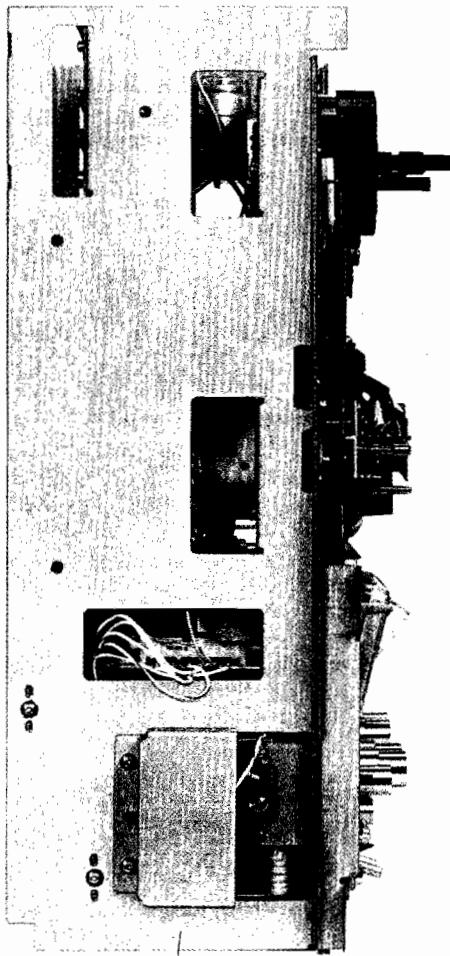
1-4. EXTERNAL VIEW



1-5. INTERNAL VIEWS







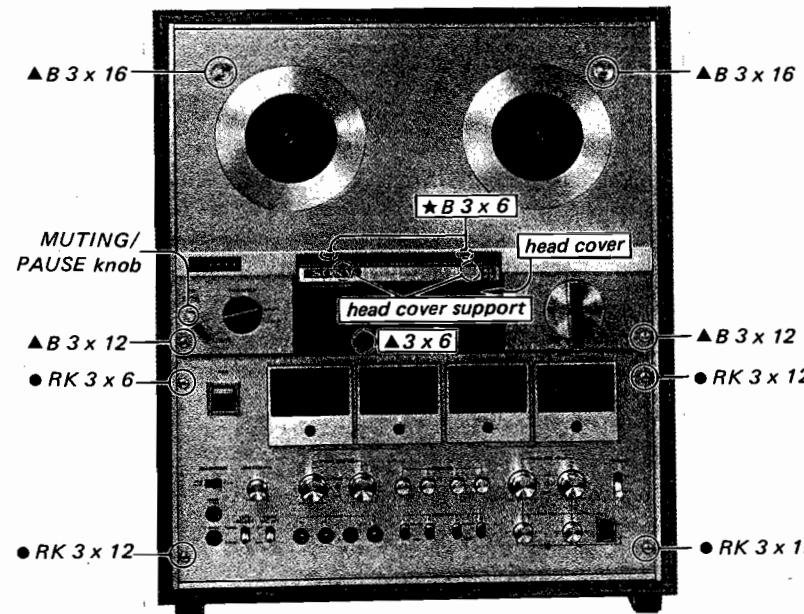
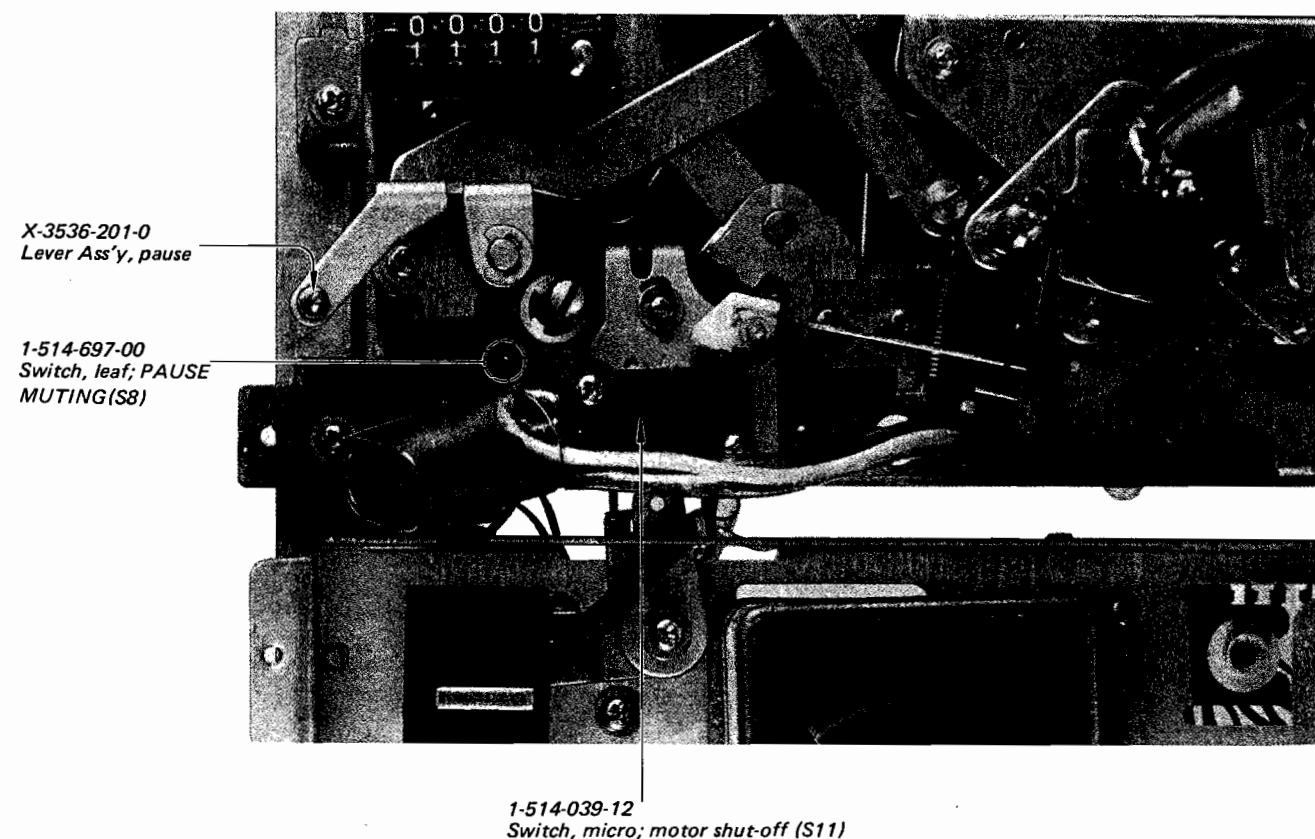
8-825-527-00
Head, erase
EF137-2904H

8-824-729-40
Head, record
RP138-2904

8-829-342-40
Head, playback
PP138-4204

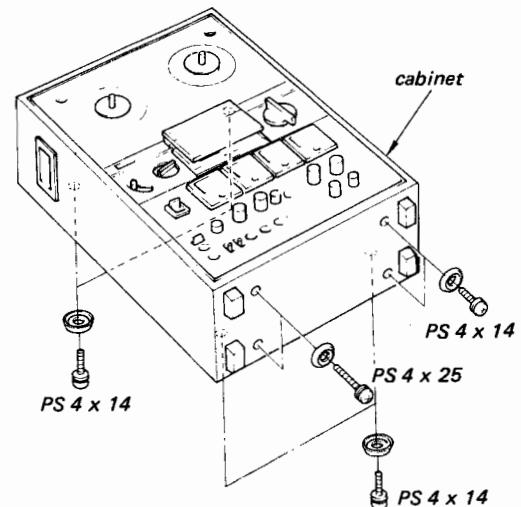
SECTION 2

DISASSEMBLY



2-3. CABINET REMOVAL

Remove eight screws.



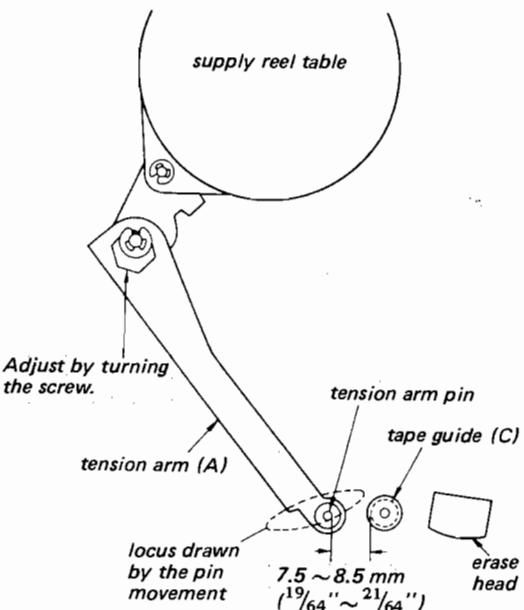
SECTION 3

ADJUSTMENTS

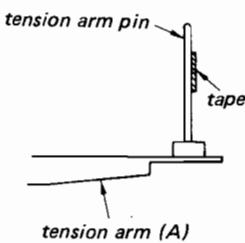
3-1. MECHANICAL ADJUSTMENTS

Tension Arm (A) Adjustment
— playback mode —

Perform this adjustment after turning supply reel table counterclockwise by hand.



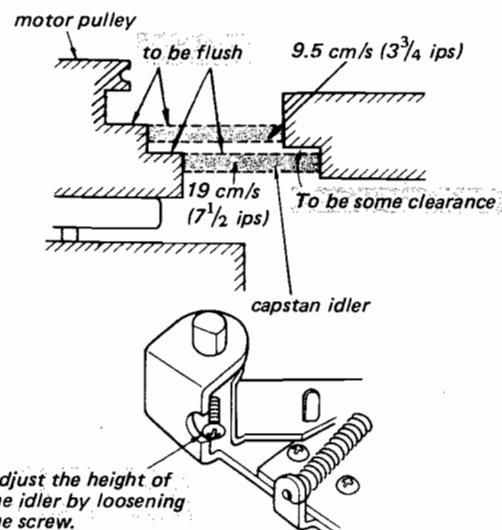
Note: Ensure that the tape uniformly comes in contact with the tension arm pin at the beginning and end of the tape. (If necessary, adjust by bending tension arm pin.)



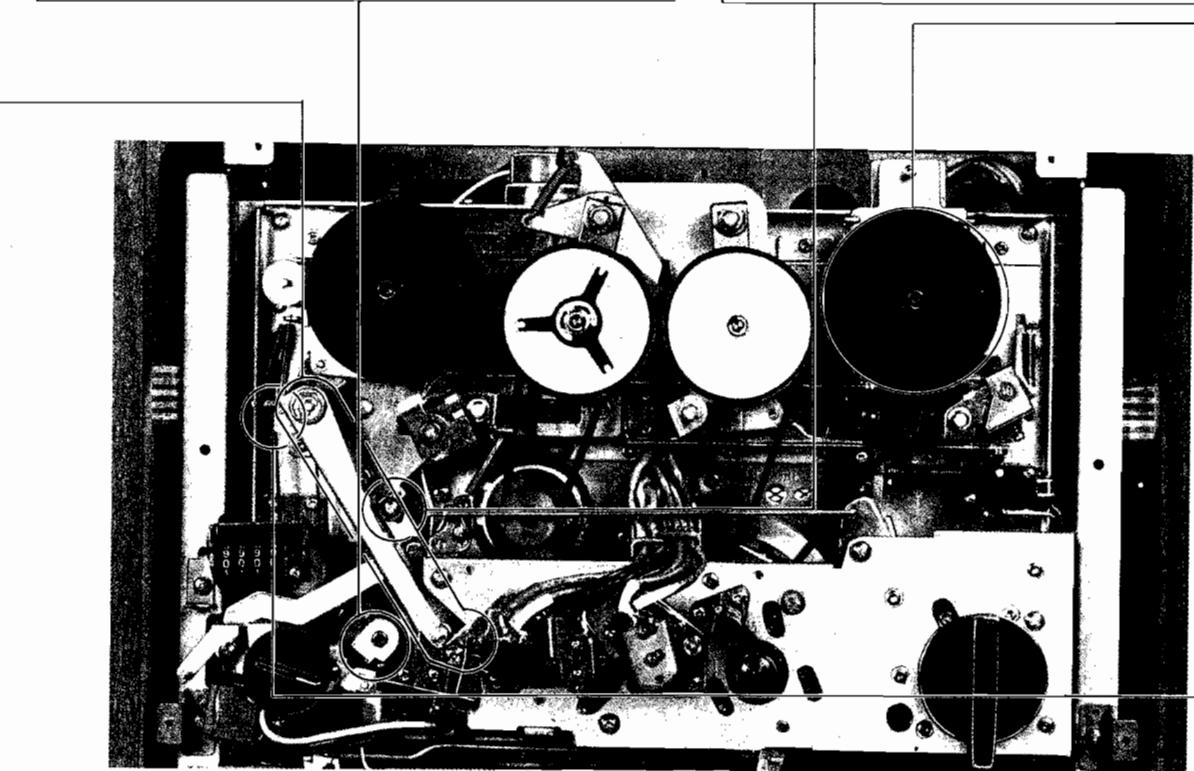
Capstan Idler Adjustment

Perform this adjustment after motor pulley height check (See Page 12).

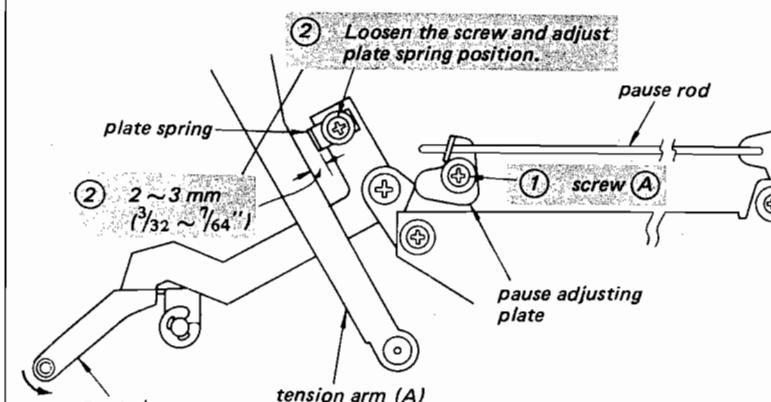
— playback mode —



- Note:**
1. Perform this adjustment for both vertical and horizontal positions.
 2. After the adjustment, apply locking compound to the screw.
 3. Make sure that capstan idler does not contact motor pulley and flywheel in stop mode.

Pause Mechanism Adjustment
— playback mode —

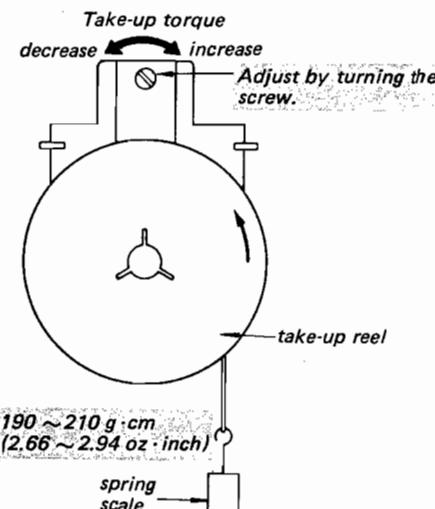
- ① With pause lever pulled, adjust pause adjusting plate position by loosening screw **(A)** so that clearance between pinch roller and capstan is 0.5 ~ 1 mm ($\frac{1}{32}$ "").



- Note:**
1. When pulling pause lever in stop mode, ensure that pause lever is not locked.
 2. When pulling pause lever in playback mode, ensure that brake operates.

Take-up Torque Adjustment

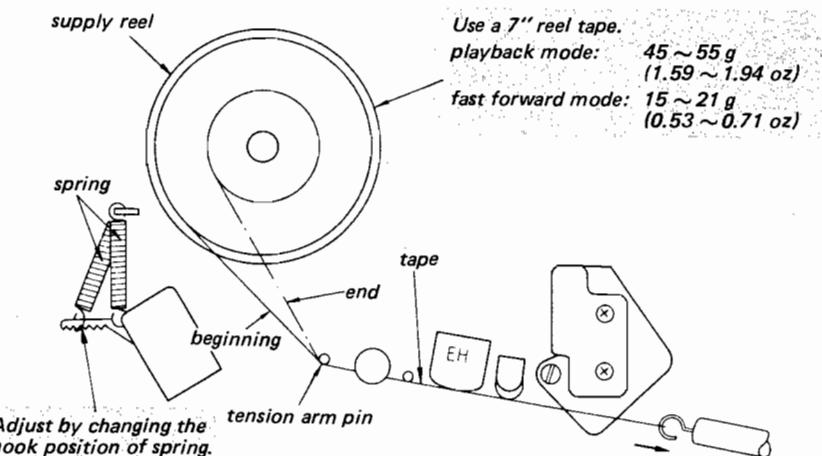
— playback mode at 9.5 cm/s (3 3/4 ips) tape speed —



Note: After the adjustment, apply locking compound to the screw.

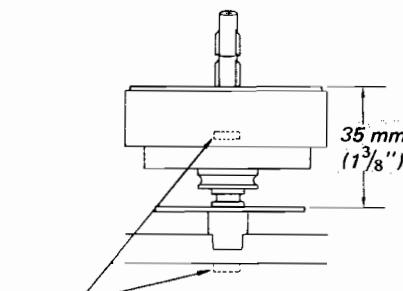
Tension Arm (A) Back-tension Adjustment

Perform this adjustment after tension arm (A) adjustment (See Page 9).



Note: If the specified back tension is not obtained by the spring hook positioning, perform tension arm (A) adjustment (See Page 9).

Reel Table Height Adjustment
— playback, rewind and fast forward mode —



Adjust by changing the washer so that the tape does not come in contact with the flange of the reel.

Washer

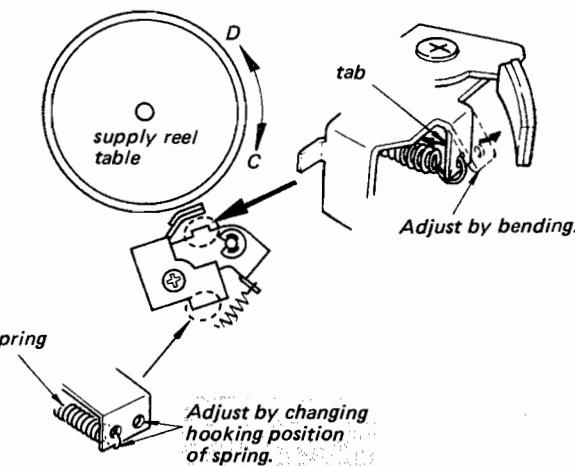
Part No.	Thickness (mm)
3-701-443-01	0.13
3-701-443-11	0.25
3-701-443-21	0.50

Note: After the adjustment, perform back tension and take-up torque adjustments. (See Page 10).

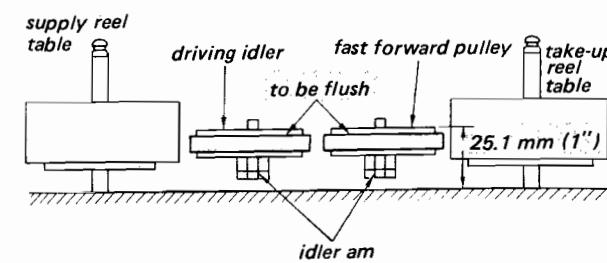
Brake Torque Adjustment (supply reel table)
— stop mode —

supply reel table braking torque	direction C	150 ~ 250 g · cm (2.1 ~ 3.5 oz · inch)
	direction D	1,300 ~ 1,700 g · cm (18 ~ 24 oz · inch)

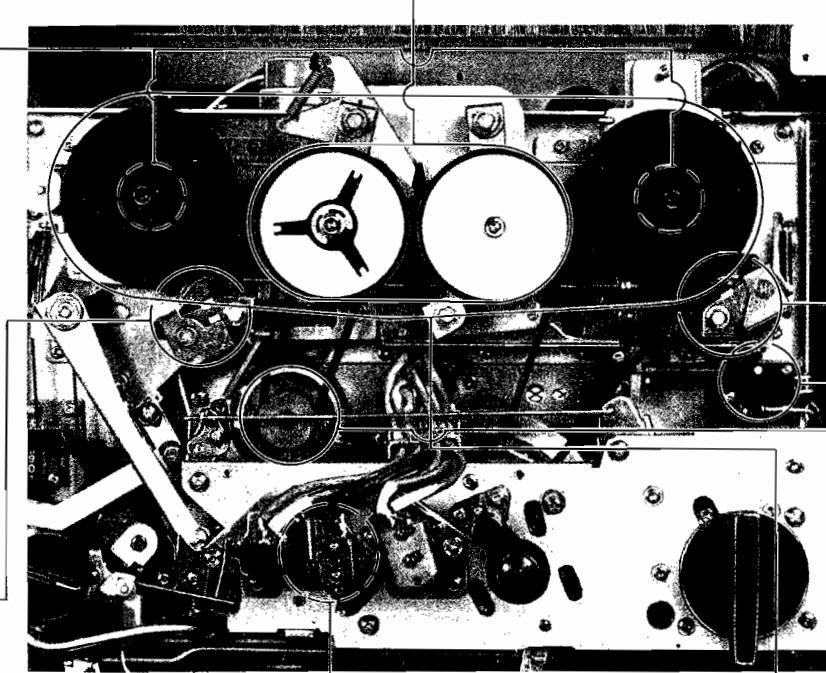
Adjustable for direction D only.



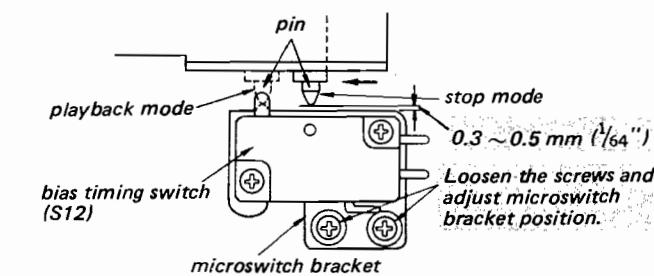
Fast Forward Pulley and Driving Idler Adjustment
— stop mode —



If necessary, adjust by bending idler arm.



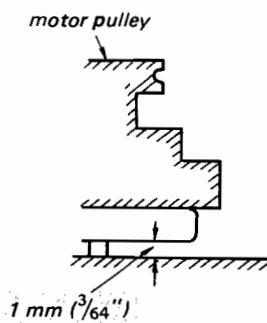
Bias Timing Switch (S12) Position Adjustment



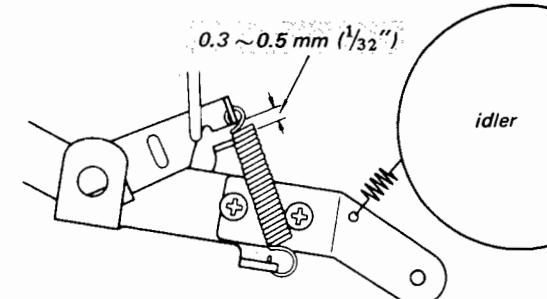
Note: Ensure the following:

1. Bias timing switch is actuated in playback mode.
2. When changing the mode from record to stop slowly, REC button is released after the bias timing switch is released.

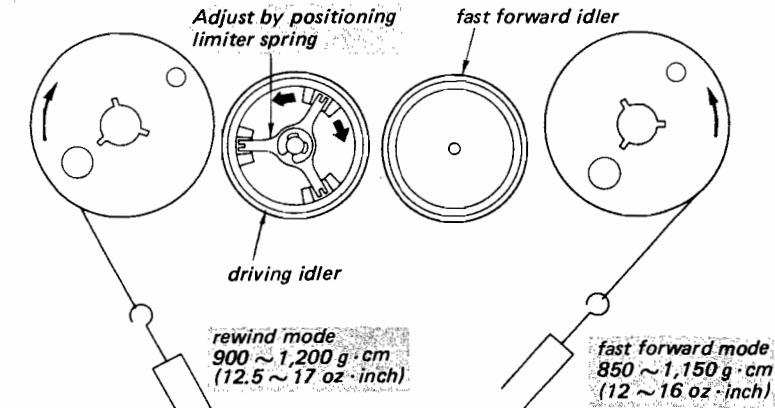
Motor Pulley Height Check



Idler Arm Stroke Check
— playback mode at 9.5 cm/s (3 1/4 ips) tape speed —



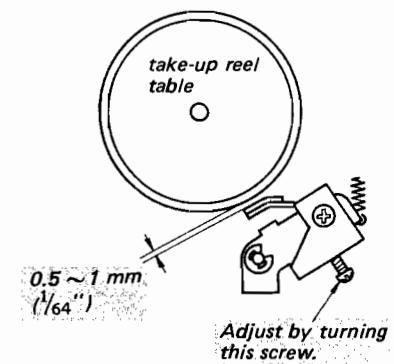
Fast Forward and Rewind Torque Adjustments
— rewind and fast forward mode —



Note: The torque should be measured just when driving idler stops rotating.

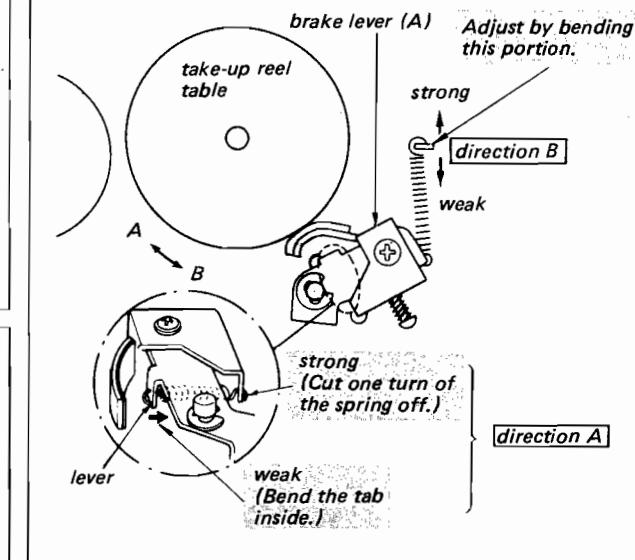
Brake Adjustment (take-up reel table)

1. Brake Shoe Adjustment
— rewind mode —



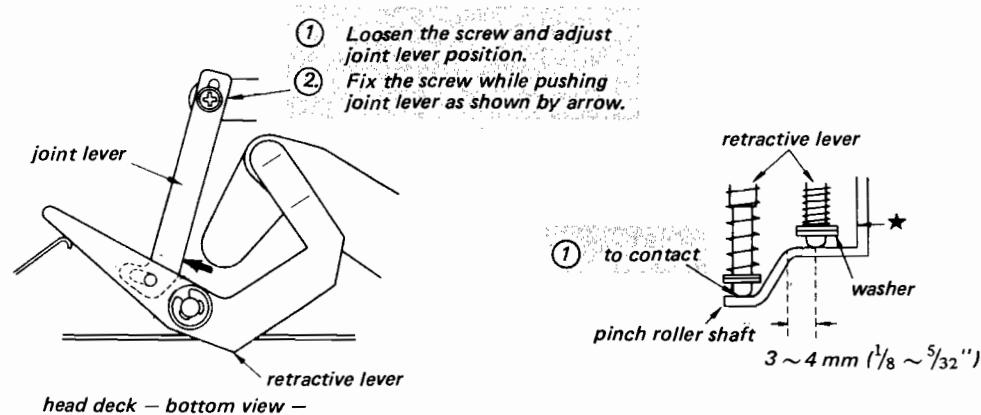
2. Brake Torque Adjustment
— stop mode —

take-up reel table braking torque	direction B	350 ~ 450 g · cm (4.9 ~ 6.2 oz · inch)
	direction A	1,300 ~ 1,700 g · cm (18 ~ 24 oz · inch)



Pinch Roller Stroke Adjustment

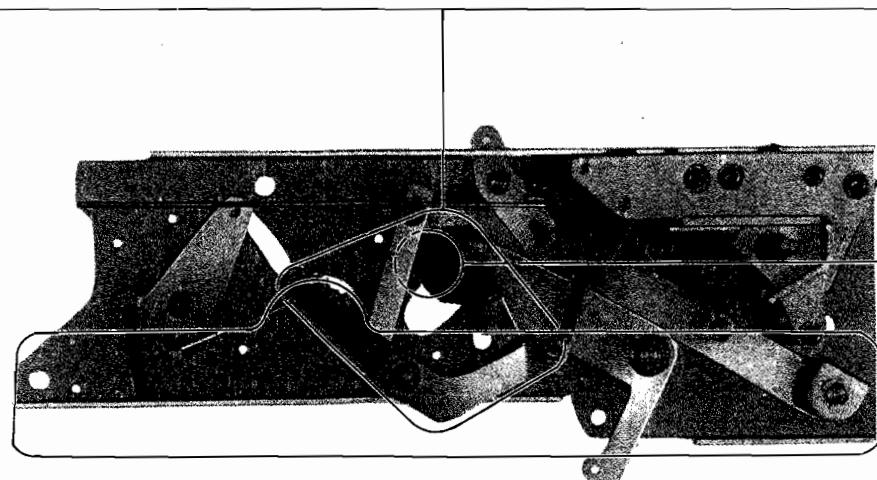
Remove head deck by removing four screws indicated by ▲ on Page 41.

- stop mode -

Note: 1. Put dummy capstan * into capstan bearing and ensure that pinch roller shaft moves by $3 \sim 4 \text{ mm } (1/8 \sim 5/32")$ on the retractive lever when changing the mode from stop to playback.

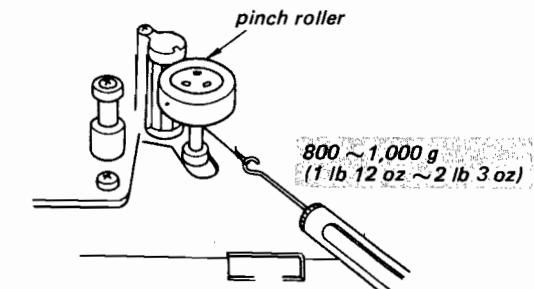
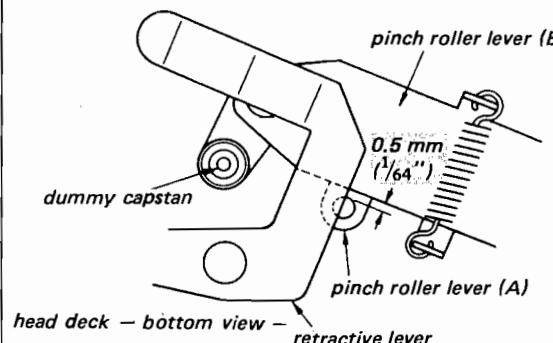
2. Ensure that washer of pinch roller shaft does not contact the part indicated by ★ when changing the mode from playback to fast forward slowly.
3. Apply locking compound to the screw.

* Dummy Capstan (capstan shaft)
Prepare a flywheel ass'y (X-3472-003-0) and remove capstan shaft from it by patting the head of the capstan shaft with the hammer, taking care not to bend the shaft.

**Bottom view of head deck****Pinch Roller Pressure Check**

1. Put dummy capstan * into capstan bearing and ensure the following.

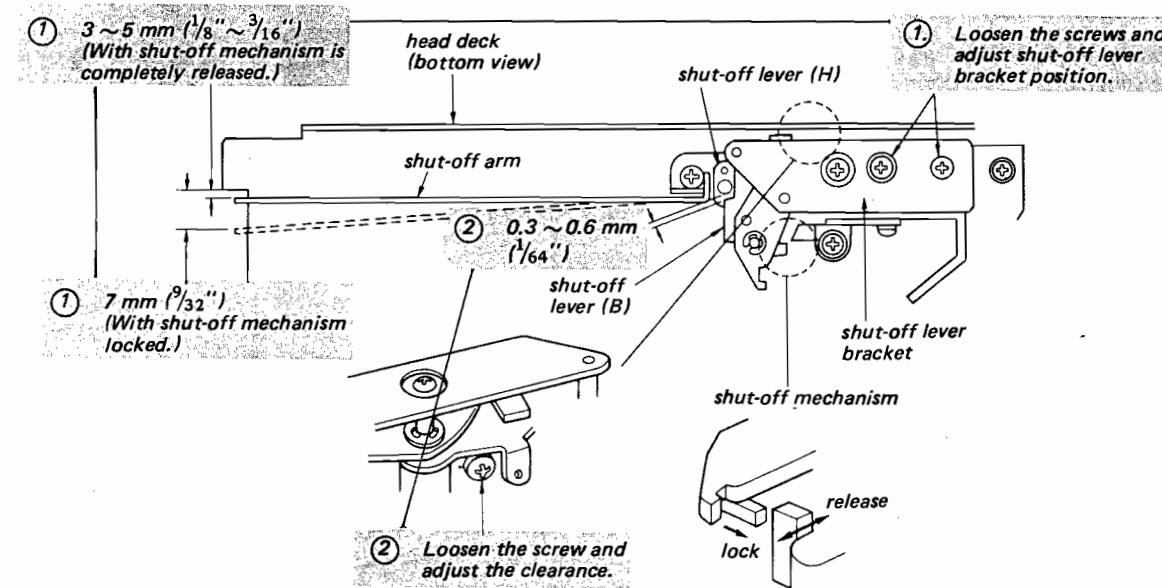
2. Measure the pressure.

- playback mode -

Note: The pressure should be measured just when the pinch roller releases from capstan.

* Dummy capstan (capstan shaft)

Prepare a flywheel ass'y (X-3472-003-0) and remove capstan shaft from it by patting the head of the capstan shaft with the hammer, taking care not to bend the shaft.

Shut-off Mechanism Adjustment**- stop mode -**

Note: After the adjustment, apply locking compound to the screws.

3-2. ELECTRICAL ADJUSTMENTS

PRECAUTION

1. Clean the following parts with alcohol moistened swab:
 - record head
 - playback head
 - erase head
 - capstan
 - pinch roller
2. Demagnetize the record head and the playback head with a head demagnetizer. Do not use a magnetized screwdriver for adjustments.
3. The adjustments should be performed in the order arranged in the service manual.
4. The adjustments and the measurements should be performed with rated power supply voltage, unless otherwise specified.
5. After the adjustments, apply locking compound to the adjusted parts.

Test Equipment/Tools Required:

audio oscillator (af osc)
 VTVM
 digital frequency counter
 speed checker (SONY LFM-30)
 attenuator (600Ω)
 $\frac{1}{4}$ W resistors, 600Ω , $10 k\Omega$, $100 k\Omega$
 blank tape { SONY SLH-S1 (SPECIAL)
 { SONY NPS-1 (NORMAL)
 SONY test tapes:
 J-9-F1
 J-19-F2
 SPC-47

Standard Levels:

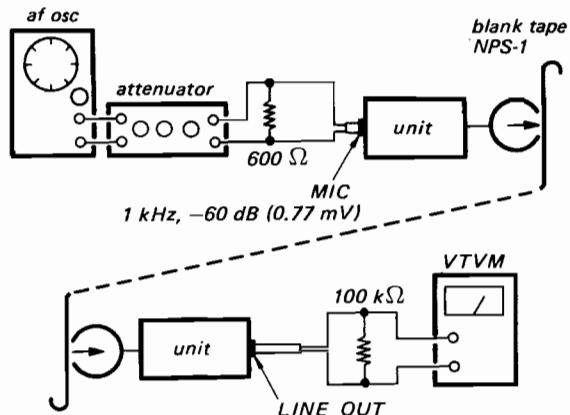
Input	Impedance	Signal level
MIC	600Ω	-60 dB (0.77 mV)
LINE IN	$10 k\Omega$	-10 dB (0.25 V)
Output	Load Impedance	Signal level
LINE OUT	$100 k\Omega$	0 dB (0.775 V)

Normal REC VOL Control Position:

REC VOL (MIC)

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 REC VOL (LINE): MIN
 FRONT MIC ATT switch: 0 dB
 PAN POT switch: OFF
 REC MODE buttons: pressed
 MONITOR switch: TAPE

Mode: record and simultaneous playback

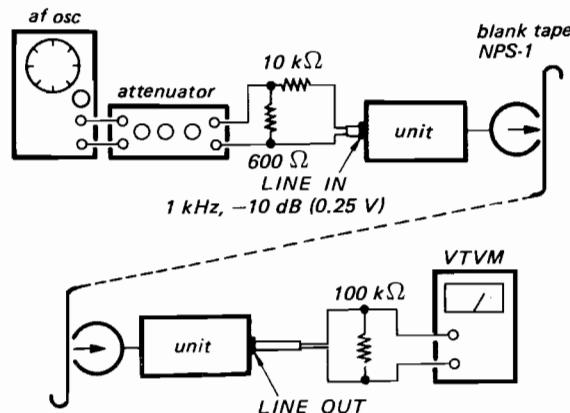


Turn REC VOL (MIC) control for 0 dB (0.775 V) VTVM reading.

REC VOL (LINE)

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 REC VOL (MIC): MIN
 PAN POT switch: OFF
 REC MODE buttons: pressed
 MONITOR switch: TAPE

Mode: record and simultaneous playback



Turn REC VOL (LINE) control for 0 dB (0.775 V) VTVM reading.

1. Tape Path Adjustment and Head Height Rough Adjustment

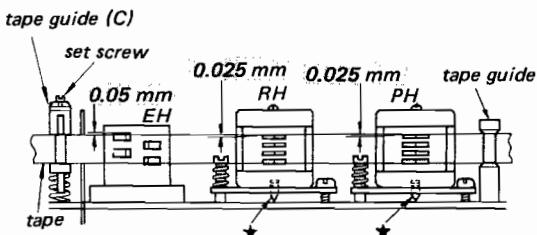
Procedure:

A) Tape Path Adjustment

1. Loosen the set screw.
2. Adjust tape guide (C) so that upper edge of the tape is aligned on upper edge of the erase head core.
3. Turn tape guide (C) 35° clockwise.
4. Fix the set screw.

B) Head Rough Height Adjustments

1. Adjust the screws indicated by ★ by turning alternately in the same direction so that upper edges of the erase, record and the playback heads are aligned on the upper edge of the tape.
2. Turn the screws indicated by ★ 15° clockwise.



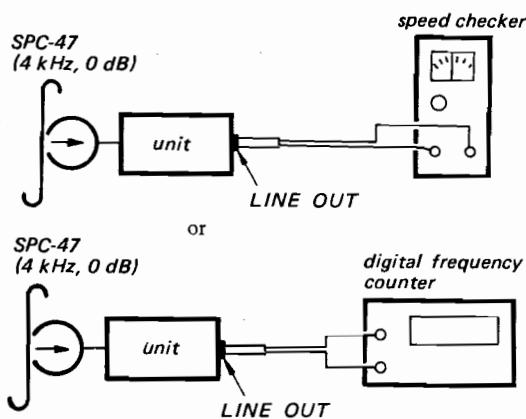
2. Tape Speed Adjustment

Settings:

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 MONITOR switch: TAPE
 PAN POT switch: OFF
 REC MODE buttons: released

Procedure:

Mode: playback

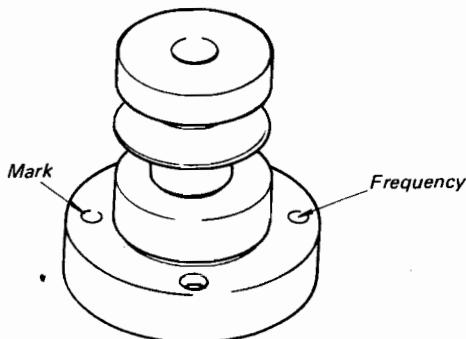


Specification:

speed checker	digital frequency counter
-1.5 ~ +1.5 %	3940 ~ 4060

If necessary, replace motor pulley.

Motor Pulley



Part No.	Mark	Speed
3-518-068-61	+ 2	faster
3-518-068-51	+ 1	
3-518-068-41	+ 0.5	
3-518-068-01	0	
3-518-068-11	- 0.5	
3-518-068-21	- 1	
3-518-068-31	- 2	slower

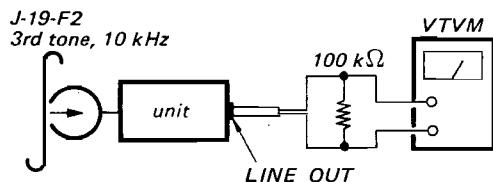
3. Playback Head Azimuth Adjustment

Settings:

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 MONITOR switch: TAPE
 PAN POT switch: OFF
 REC MODE buttons: released

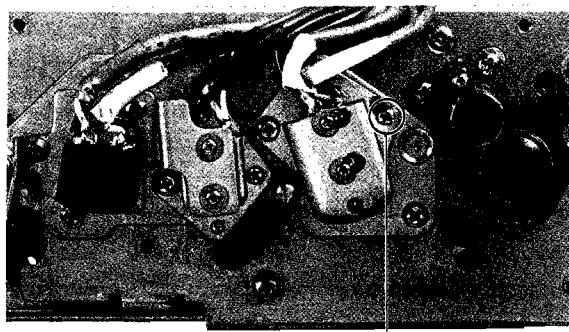
Procedure:

Mode: playback



Adjust the azimuth adjusting screw for the highest VTVM reading.

Adjustment Location:



azimuth adjusting screw

- Note:**
1. Several peaks may appear, take the highest.
 2. If the highest peak readings for all the channels cannot be obtained at the same screw position, take the mid between the both extreme positions of the screws. At that time, ensure that the difference between the maximum and the minimum readings is not more than 1 dB on the VTVM.
 3. If you turn the azimuth adjusting screw more than one turn, perform tape path adjustment (See Page 16).
 4. When touching the supply reel table lightly, ensure that VTVM reading is not increased more than 1 dB.

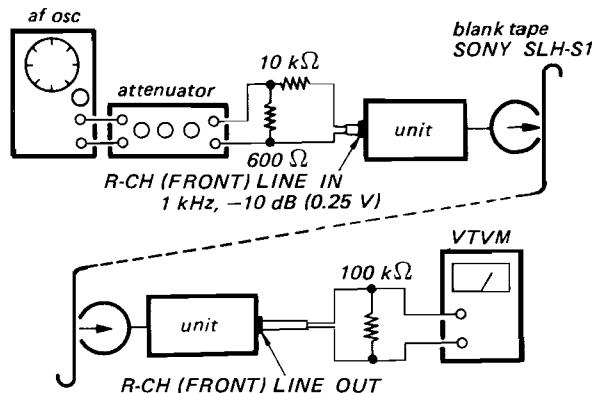
4. Record Head Height Adjustment

Settings:

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: SPECIAL
 LINE OUT VOL control: MAX
 PAN POT switch: OFF
 REC MODE buttons: pressed
 MONITOR switch: TAPE
 REC VOL (LINE) control: normal position
 (See Page 15.)

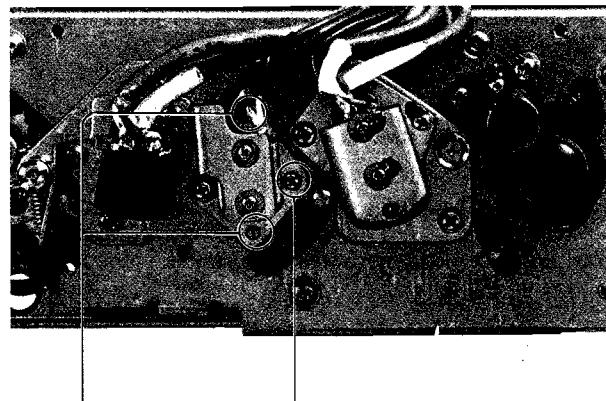
Procedure:

Mode: record and simultaneous playback



Adjust the three screws for the maximum R-CH (FRONT) VTVM reading.

Adjustment Location:



zenith and height adjusting screws

azimuth adjusting screw

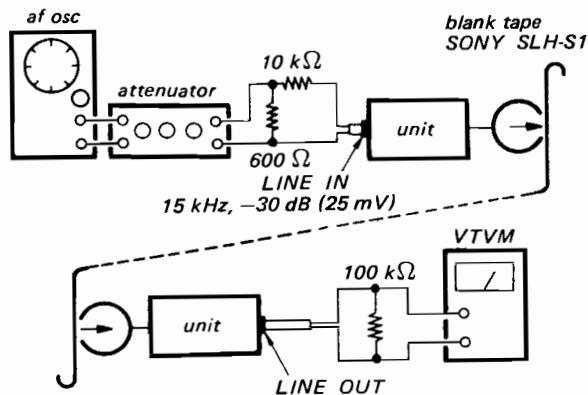
5. Record Head Azimuth Adjustment

Settings:

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: SPECIAL
 LINE OUT VOL control: MAX
 PAN POT switch: OFF
 REC MODE buttons: pressed
 MONITOR switch: TAPE
 REC VOL (LINE) control: normal position
 (See Page 15.)

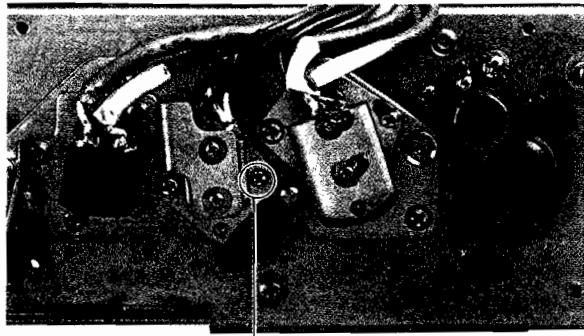
Procedure:

Mode: record and simultaneous playback



Adjust the azimuth adjusting screw for the highest VTVM reading.

Adjustment Location:



azimuth adjusting screw

- Note:**
1. If the highest peak reading for all the channels cannot be obtained at the same screw position, take the mid between the both extreme positions of the screws and the difference between each extreme peak level and the adjusted output level should be within 1 dB difference. If the difference is more than 1 dB, change the record head.
 2. If you turn the azimuth adjusting screw more than one turn, perform record head height adjustment (See Page 17).

6. Phasing Adjustment

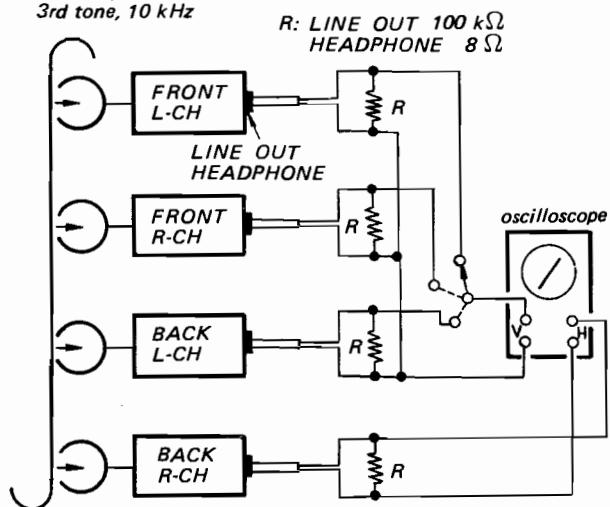
Settings:

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 MONITOR switch: TAPE
 PAN POT switch: OFF
 REC MODE buttons: released

Procedure:

Mode: playback

J-19-F2
 1st tone, 400 Hz
 3rd tone, 10 kHz



Check the following:

J-19-F2	On the oscilloscope
2nd tone (400 Hz)	in phase
3rd tone (10 kHz)	in phase ±90°

If necessary, finely adjust the playback head azimuth adjusting screw. (See Page 17.)

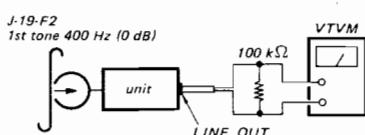
7. Playback Output Level Adjustment

Settings:

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 MONITOR switch: TAPE
 PAN POT switch: OFF
 REC MODE buttons: released

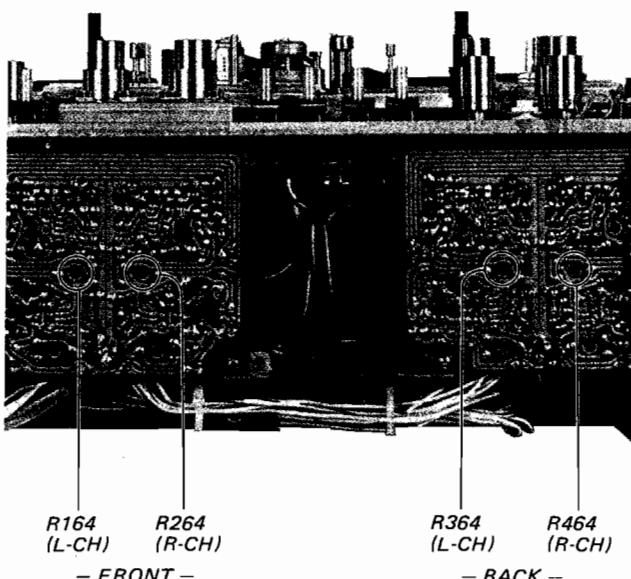
Procedure:

Mode: playback



Adjust R164, 264, 364, 464 for 0 dB (0.775 V) VTVM reading.

Adjustment Location:



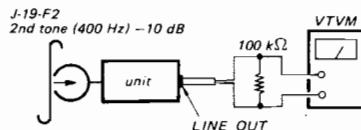
8. Playback Equalizer Adjustment

Settings:

TAPE SPEED switch: 19 cm/s and 9.5 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 MONITOR switch: TAPE
 PAN POT switch: OFF
 REC MODE buttons: released

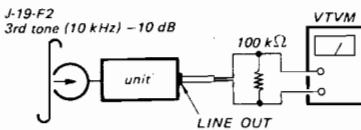
Procedure:

1. Mode: playback [TAPE SPEED switch: 19 cm/s (7½ ips)]



Make sure that VTVM reading is -10 dB (0.25 V).

2. Mode: playback



Adjust the resistors R157, 257, 357, 457 for -10.5 dB (0.23 V) VTVM reading.

3. Play back test tape J-19-F2 and ensure that each tone output level deviation against 2nd tone is as follows.

J-19-F2	Tone	3	4	5	6	7
	Frequency (Hz)	10 kHz	12.5 k	7 k	80	40
Level Deviation from 2nd tone (400 Hz)	-0.5 ±1 dB	-0.5 ±2 dB	-0.5 ±1.5 dB	-2 ±1.5 dB	+2 ±2 dB	

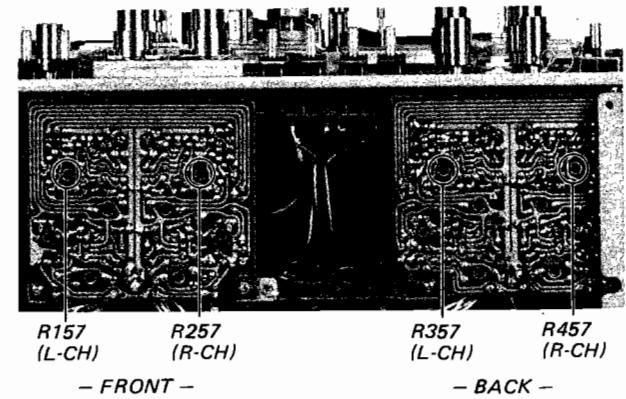
4. Play back test tape J-9-F1 and ensure that each tone output level deviation against 3rd tone is as follows.

[TAPE SPEED switch: 9.5 cm/s (3¾ ips)]

J-9-F1	Tone	4	5	6	7
	Frequency (Hz)	5 k	3 k	200	80
Level Deviation from 3rd tone (400 Hz)	-1 ±2 dB	-1 ±1.5 dB	+0.5 ±1.5 dB	+1.5 ±2 dB	

Note: When this adjustment changes the playback level, readjust the playback level.

Adjustment Location:



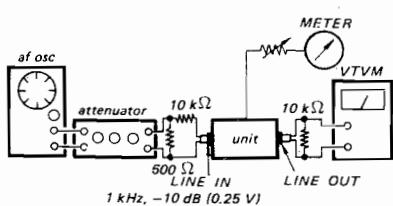
9. Level Meter Calibration

Settings:

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 MONITOR switch: TAPE
 PAN POT switch: OFF
 REC MODE buttons: pressed
 REC VOL (LINE): normal position
 (See Page 15.)

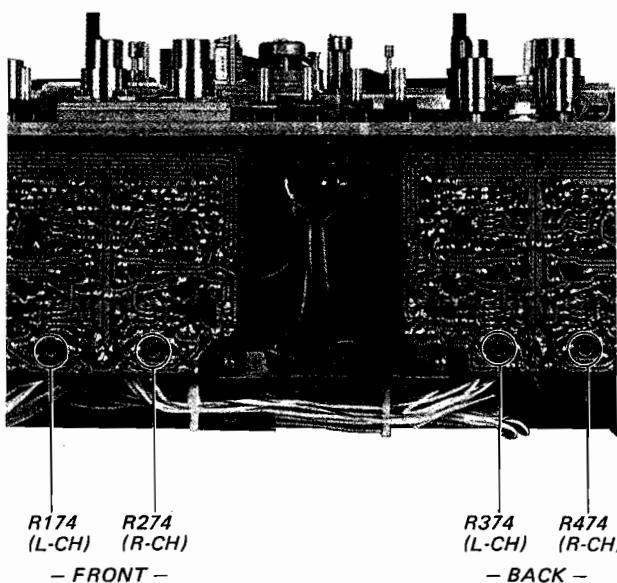
Procedure:

Mode: record



Adjust the resistors R174, 274, 374, 474 so that the pointer of level meter is at 0 VU on the scale.

Adjustment Location:



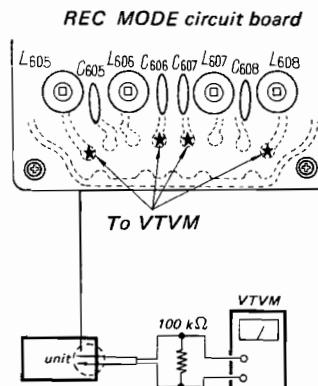
10. Trap Coil Adjustment

Settings:

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 PAN POT switch: OFF
 REC MODE buttons: pressed
 REC VOL (MIC): MIN
 REC VOL (LINE): MIN

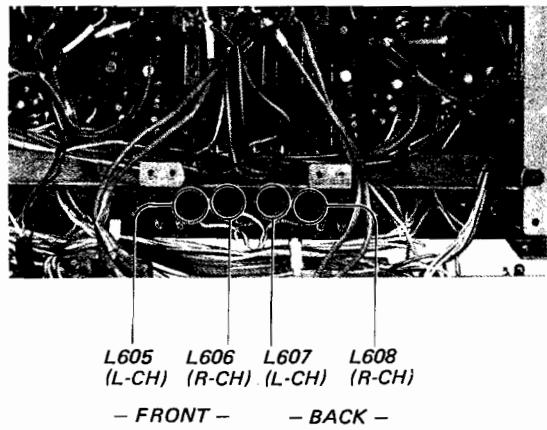
Procedure:

Mode: record



Adjust the trap coils L605, 606, 607, 608 for minimum VTVM reading.

Adjustment Location:

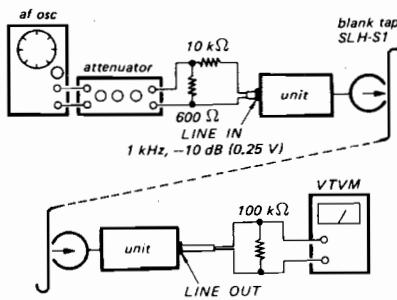


11. Record Bias Adjustment**Settings:**

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: SPECIAL
 LINE OUT VOL control: MAX
 MONITOR switch:
 PAN POT switch:
 REC MODE buttons:
 REC VOL (LINE):
 (See Page 15.)

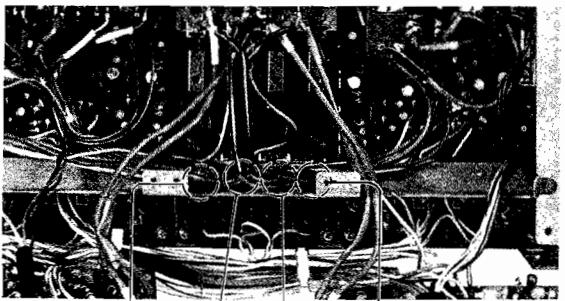
Procedure:

1. Mode: record and simultaneous playback



Adjust the trimmer capacitors C609, 610, 611, 612 for maximum VTVM reading.

2. Turn the trimmer capacitor clockwise for 0.5 dB below the maximum reading.

Adjustment Location:

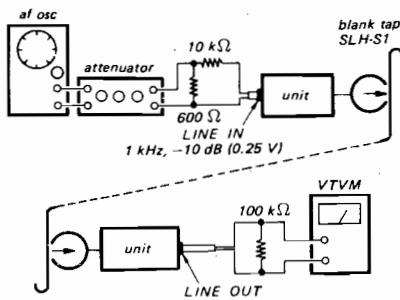
C609 (L-CH) C610 (R-CH)
 - FRONT - - BACK -

12. Record Level Adjustment**Settings:**

TAPE SPEED switch: 19 cm/s and 9.5 cm/s
 TAPE SELECT switch: SPECIAL and NORMAL
 LINE OUT VOL control: MAX
 MONITOR switch:
 PAN POT switch:
 REC MODE buttons:
 REC VOL (LINE):
 (See Page 15.)

Procedure:

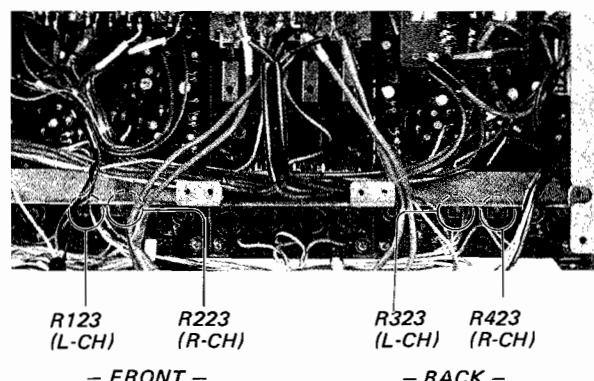
1. Mode: record and simultaneous playback
 [TAPE SPEED switch: 19 cm/s (7½ ips)]



Adjust the resistors R123, 223, 323, 423 for 0 dB (0.775 V) VTVM reading.

TAPE SPEED	TAPE	
	SPECIAL	NORMAL
19 cm/s (7½ ips)	0 dB ± 1 dB (0.69 ~ 0.87 V)	* 0 dB ± 1 dB (0.69 ~ 0.87 V)
9.5 cm/s (3¾ ips)	* 0 dB ± 2 dB (0.62 ~ 0.97 V)	* 0 dB ± 2 dB (0.62 ~ 0.97 V)

* check only

Adjustment Location:

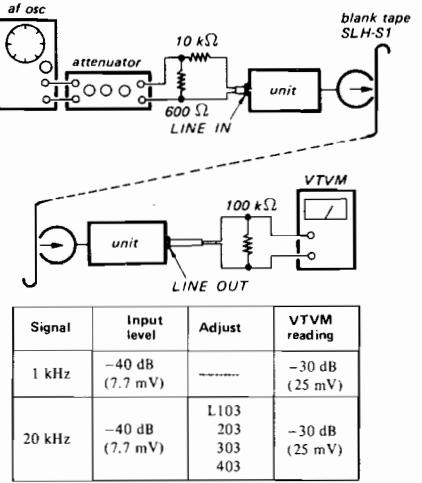
R123 (L-CH) R223 (R-CH)
 - FRONT - - BACK -

13. Record Equalizer Adjustment (SPECIAL)**Settings:**

TAPE SPEED switch: 19 cm/s and 9.5 cm/s
 TAPE SELECT switch: SPECIAL
 LINE OUT VOL control: MAX
 MONITOR switch:
 PAN POT switch:
 REC MODE buttons:
 REC VOL (LINE):
 (See Page 15.)

Procedure:

1. Mode: record and simultaneous playback

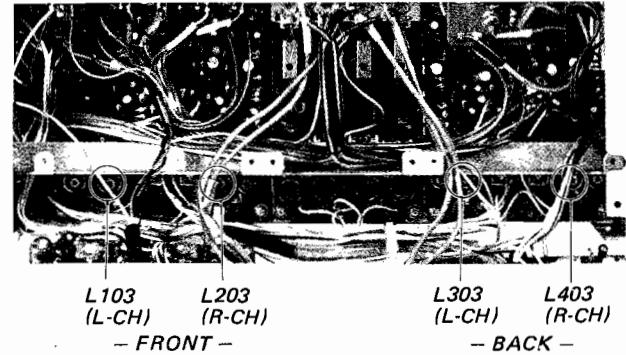


Signal	Input level	Adjust	VTVM reading
1 kHz	-40 dB (7.7 mV)	-----	-30 dB (25 mV)
20 kHz	-40 dB (7.7 mV)	L103 203 303 403	-30 dB (25 mV)

2. Check the frequency response:

Signal (input level -40 dB, 7.7 mV)	Output Level Deviation from 1 kHz signal	
	19 cm/s (7½ ips)	9.5 cm/s (3¾ ips)
30 Hz	±3 dB	±3 dB
200 Hz	±3 dB	±3 dB
6 kHz	±3 dB	±3 dB
10 kHz	±3 dB	±3 dB
15 kHz	±3 dB	±3 dB
20 kHz	-----	±3 dB
23 kHz	±3 dB	-----

Note: If necessary, readjust the record bias adjustment (See Page 21).

Adjustment Location:

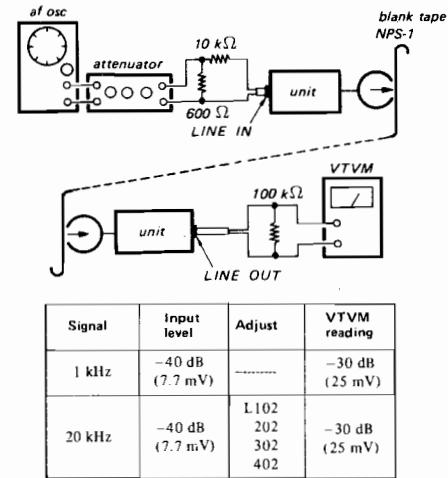
L103 (L-CH) L203 (R-CH)
 - FRONT - - BACK -

14. Record Equalizer Adjustment (NORMAL)**Settings:**

TAPE SPEED switch: 19 cm/s and 9.5 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 MONITOR switch:
 PAN POT switch:
 REC MODE buttons:
 REC VOL (LINE):
 (See Page 15.)

Procedure:

1. Mode: record and simultaneous playback

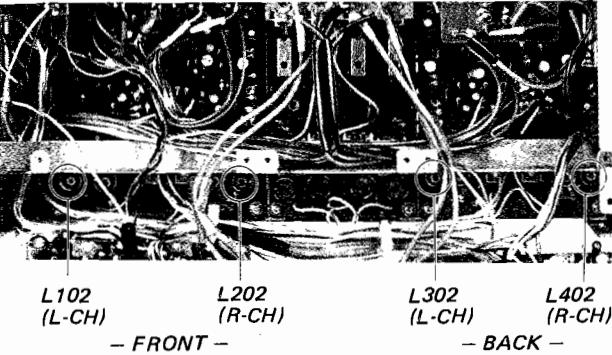


Signal	Input level	Adjust	VTVM reading
1 kHz	-40 dB (7.7 mV)	-----	-30 dB (25 mV)
20 kHz	-40 dB (7.7 mV)	L102 202 302 402	-30 dB (25 mV)

2. Check the frequency response:

Signal (input level -40 dB, 7.7 mV)	Output Level Deviation from 1 kHz signal	
	19 cm/s (7½ ips)	9.5 cm/s (3¾ ips)
30 Hz	±3 dB	±3 dB
200 Hz	±3 dB	±3 dB
6 kHz	±3 dB	±3 dB
10 kHz	±3 dB	±3 dB
15 kHz	±3 dB	±3 dB
20 kHz	-----	±3 dB
23 kHz	±3 dB	-----

Note: If necessary, readjust the record bias adjustment (See Page 21).

Adjustment Location:

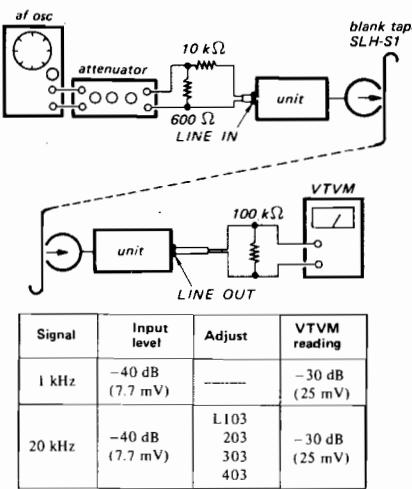
L102 (L-CH) L202 (R-CH)
 - FRONT - - BACK -

13. Record Equalizer Adjustment (SPECIAL)**Settings:**

TAPE SPEED switch:	19 cm/s and 9.5 cm/s
TAPE SELECT switch:	SPECIAL
LINE OUT VOL control:	MAX
MONITOR switch:	TAPE
PAN POT switch:	OFF
REC MODE buttons:	pressed
REC VOL (LINE):	normal position (See Page 15.)

Procedure:

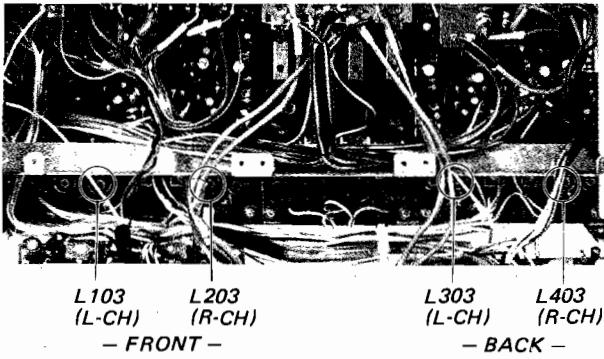
1. Mode: record and simultaneous playback



2. Check the frequency response:

Signal (input level -40 dB, 7.7 mV)	Output Level Deviation from 1 kHz signal	
	19 cm/s (7% ips)	9.5 cm/s (3% ips)
30 Hz	±3 dB	±3 dB
200 Hz	±3 dB	±3 dB
6 kHz	±3 dB	±3 dB
10 kHz	±3 dB	±3 dB
15 kHz	±3 dB	±3 dB
20 kHz	—	±3 dB
23 kHz	±3 dB	—

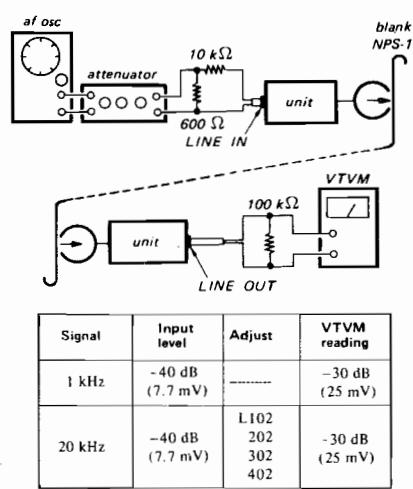
Note: If necessary, readjust the record bias adjustment (See Page 21).

Adjustment Location:**14. Record Equalizer Adjustment (NORMAL)****Settings:**

TAPE SPEED switch:	19 cm/s and 9.5 cm/s
TAPE SELECT switch:	NORMAL
LINE OUT VOL control:	MAX
MONITOR switch:	TAPE
PAN POT switch:	OFF
REC MODE buttons:	pressed
REC VOL (LINE):	normal position (See Page 15.)

Procedure:

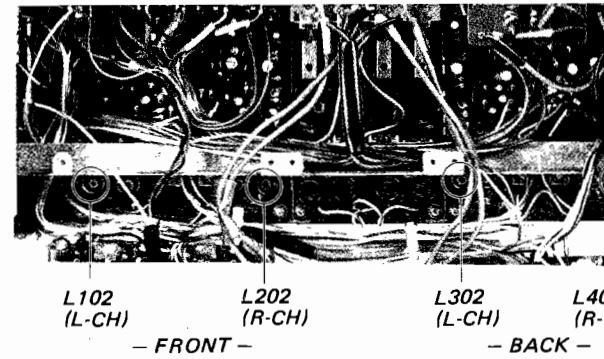
1. Mode: record and simultaneous playback



2. Check the frequency response:

Signal (input level -40 dB, 7.7 mV)	Output Level Deviation from 1 kHz signal	
	19 cm/s (7% ips)	9.5 cm/s (3% ips)
30 Hz	±3 dB	±3 dB
200 Hz	±3 dB	±3 dB
6 kHz	±3 dB	±3 dB
10 kHz	±3 dB	±3 dB
15 kHz	±3 dB	±3 dB
20 kHz	—	±3 dB
23 kHz	±3 dB	—

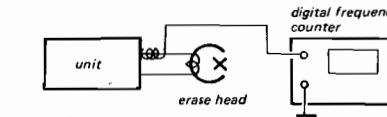
Note: If necessary, readjust the record bias adjustment (See Page 21).

Adjustment Location:**15. Dummy Coil Adjustment****Settings:**

TAPE SPEED switch:	19 cm/s
TAPE SELECT switch:	SPECIAL
LINE OUT VOL control:	MAX
MONITOR switch:	TAPE
PAN POT switch:	OFF
REC MODE buttons:	pressed

Procedure:

1. Mode: record



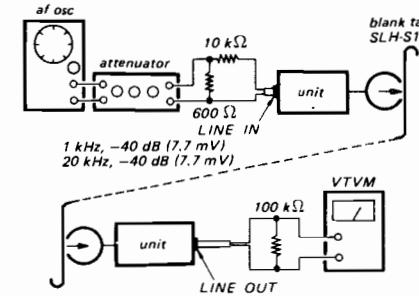
Memorize the counter reading.

Release REC MODE buttons of the following channels.	Adjust the coils so that the frequency is the same as step 1.
FRONT L-CH	L601
FRONT R-CH	L602
BACK L-CH	L603
BACK R-CH	L604

2. (1) Mode: 4-channel record and simultaneous playback

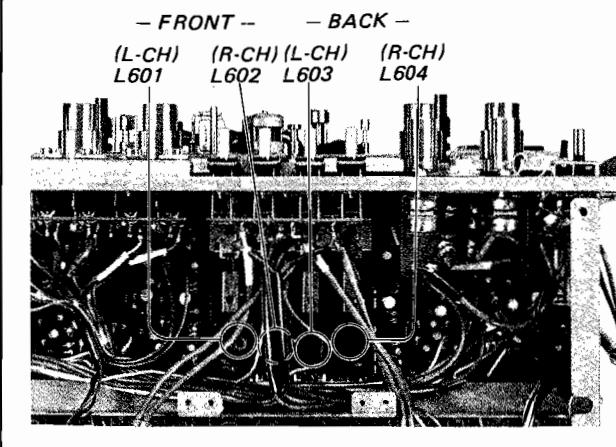
- (2) Mode: 2-channel record and simultaneous playback

- (3) Mode: 1-channel record and simultaneous playback



Make sure of the following:

Record and simultaneous playback	Output level
4-channel	0 dB (0.775 V)
2-channel	0 ± 2 dB (0.62 ~ 0.97 V)
1-channel	0 ± 2 dB (0.62 ~ 0.97 V)

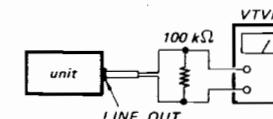
Adjustment Location:**16. Trap Coil (Bias Leakage) Adjustment****Settings:**

TAPE SPEED switch:	19 cm/s
TAPE SELECT switch:	NORMAL
LINE OUT VOL control:	MAX
MONITOR switch:	PAN
PAN POT switch:	OFF
REC MODE buttons:	pressed (FRONT buttons or BACK buttons)
REC VOL (LINE):	normal position (See Page 15.)
MONITOR switch:	SOURCE

Procedure:

1. (1) Mode: 2-channel record (FRONT L-, R-CH)

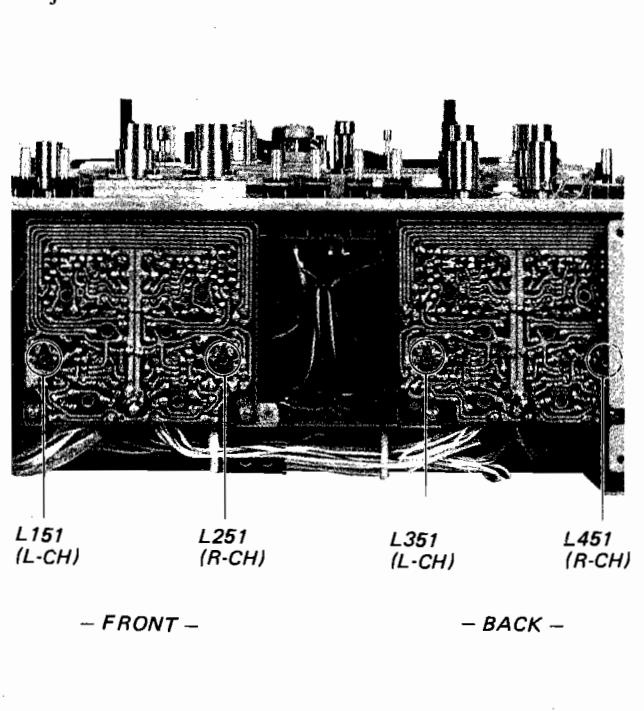
- (2) Mode: 2-channel record (BACK L-, R-CH)



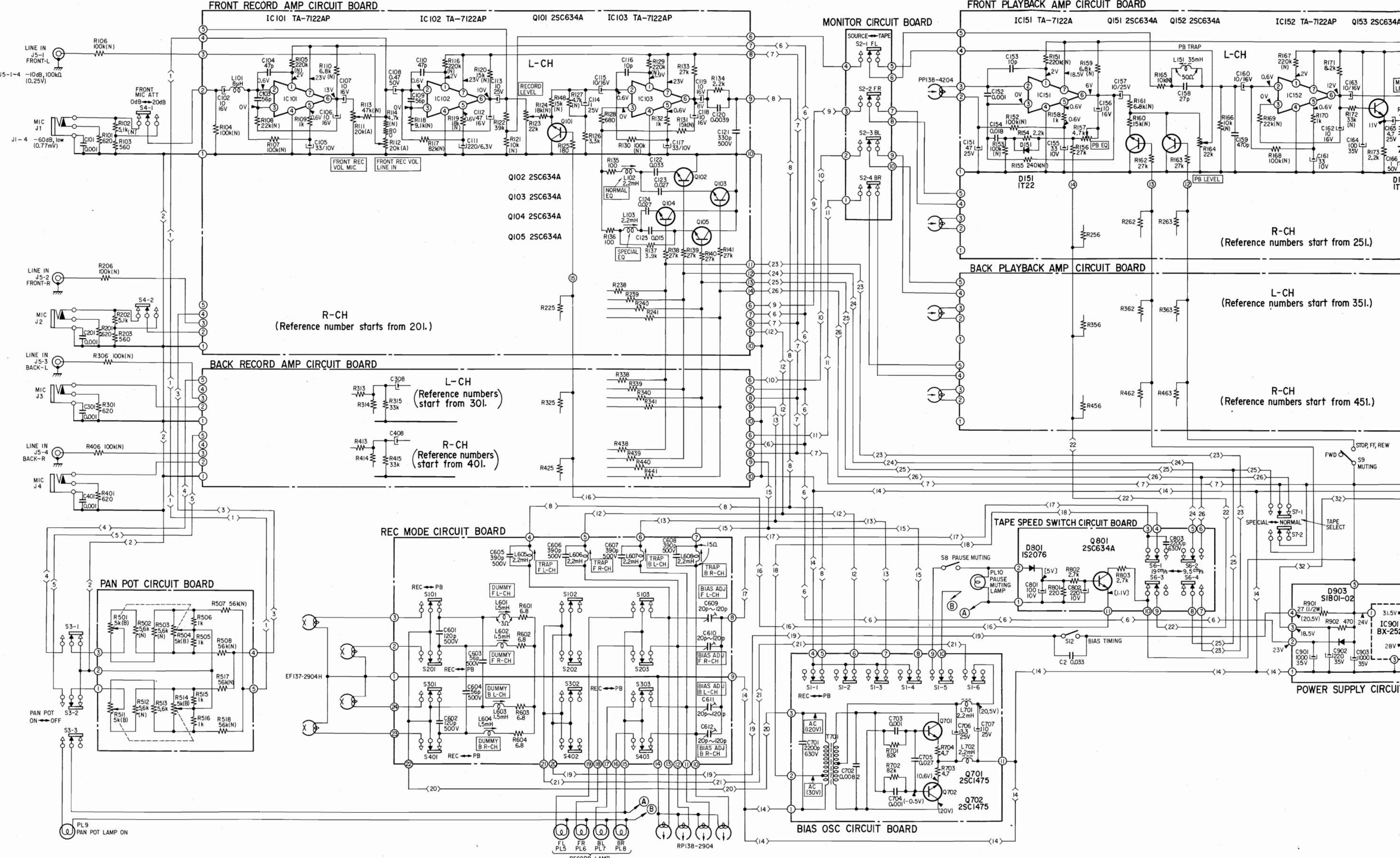
Record	Adjust	VTVM reading
FRONT L-, R-CH	L151, 251	minimum
BACK L-, R-CH	L351, 451	minimum

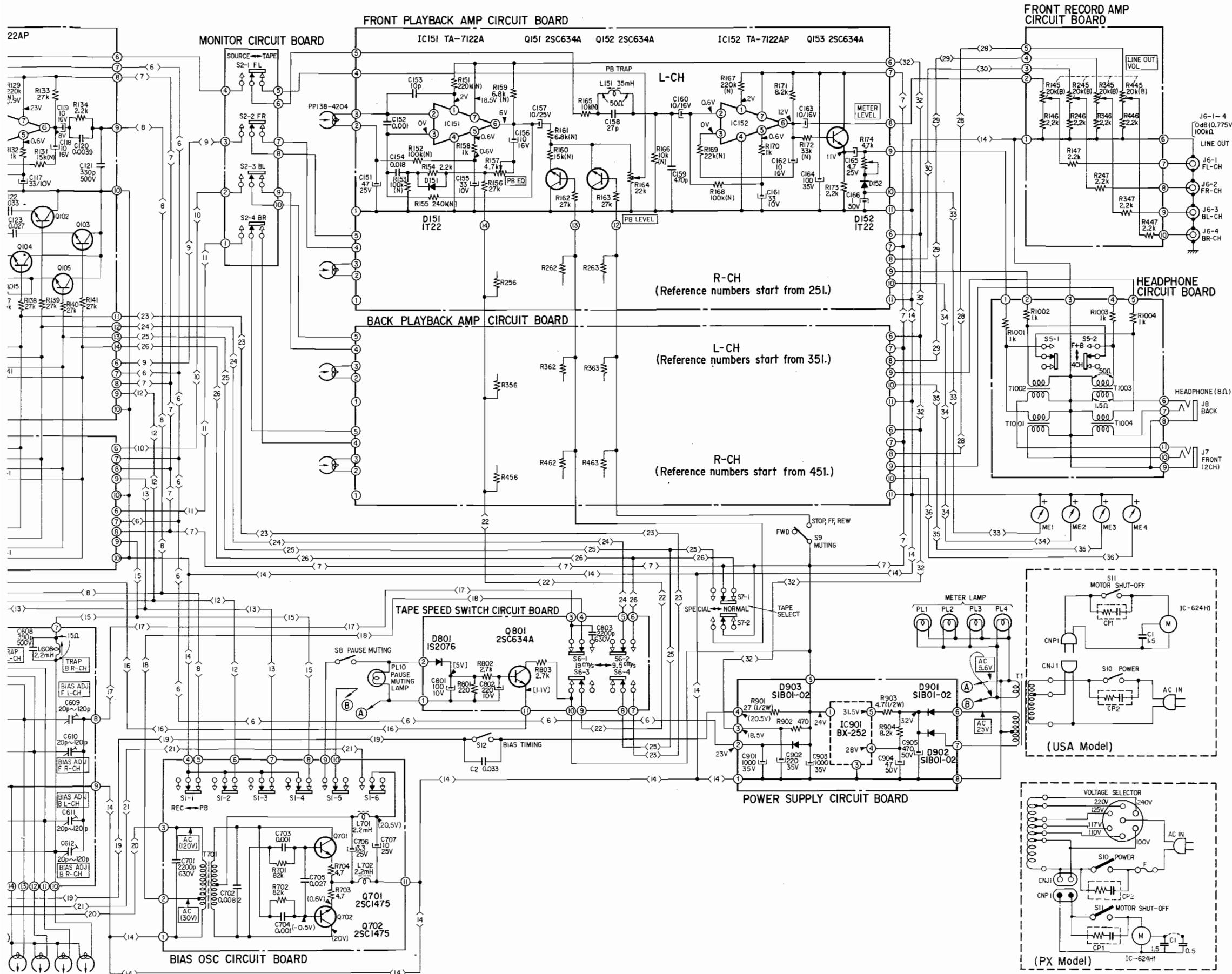
2. Make sure of the following:

Record	VTVM reading
4-channel	Less than -40 dB (7.7 mV)
2-channel	Less than -40 dB (7.7 mV)
1-channel	Less than -40 dB (7.7 mV)

Adjustment Location:

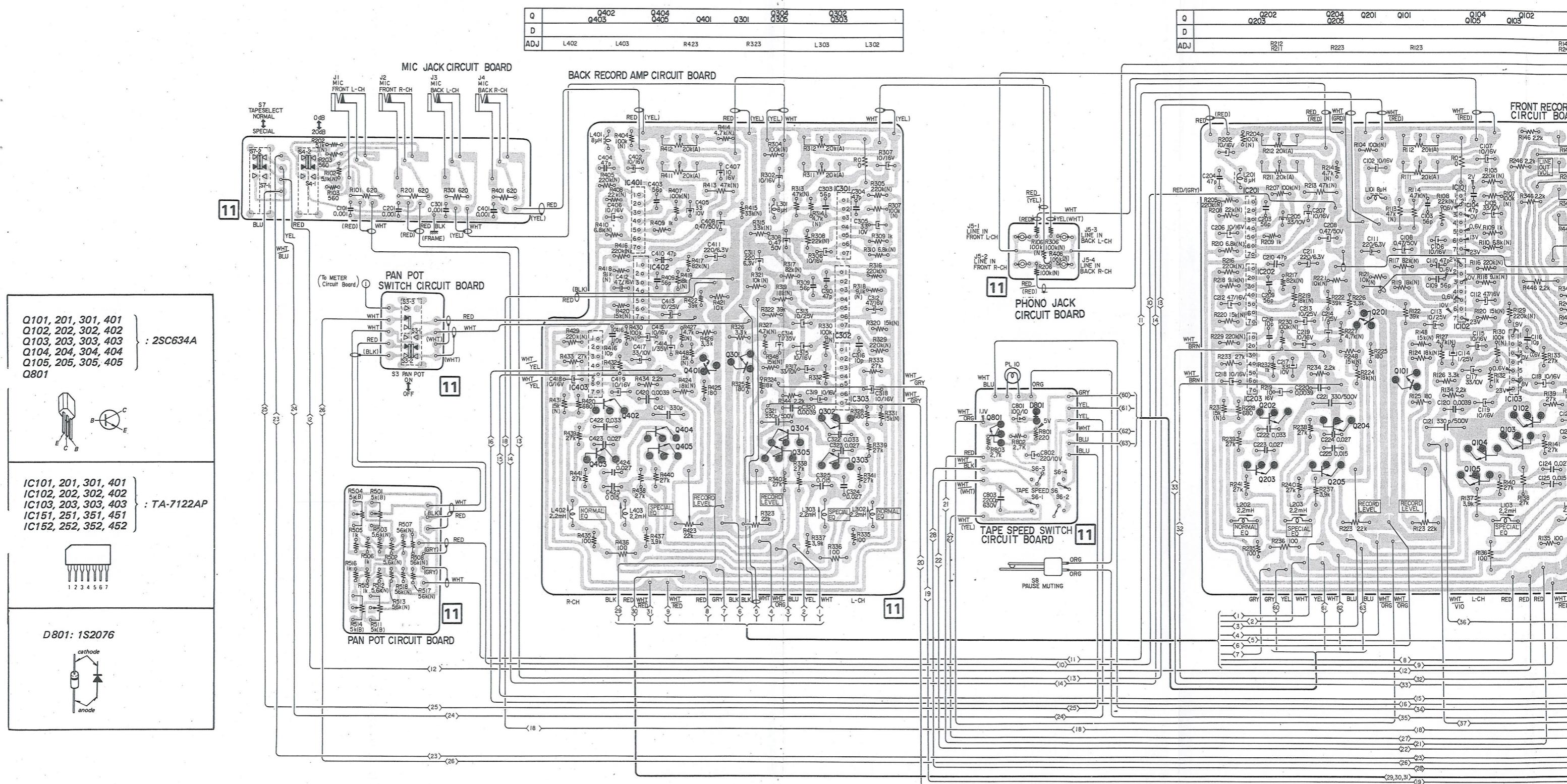
4-1. SCHEMATIC DIAGRAM





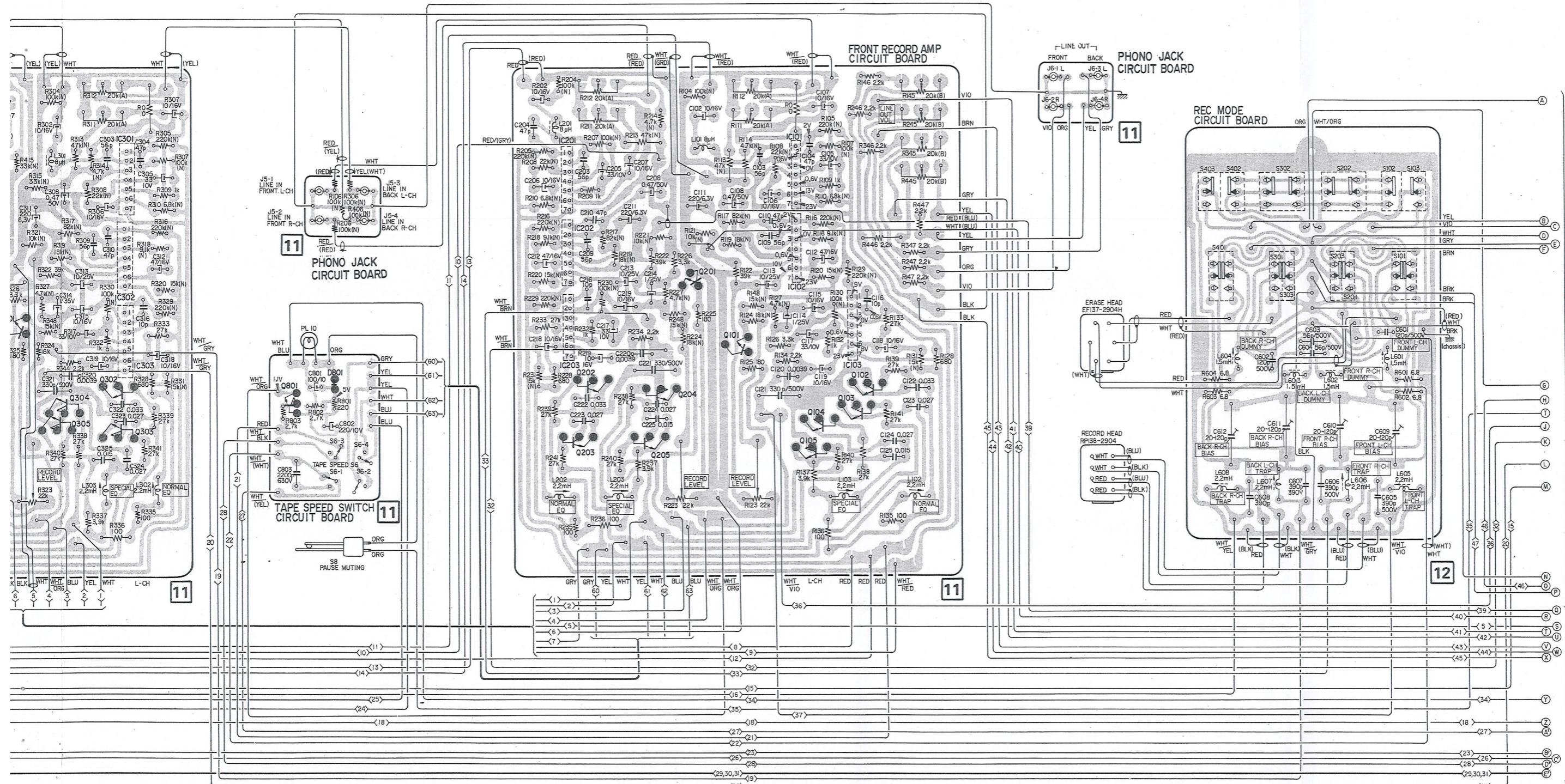
4-2. MOUNTING DIAGRAMS

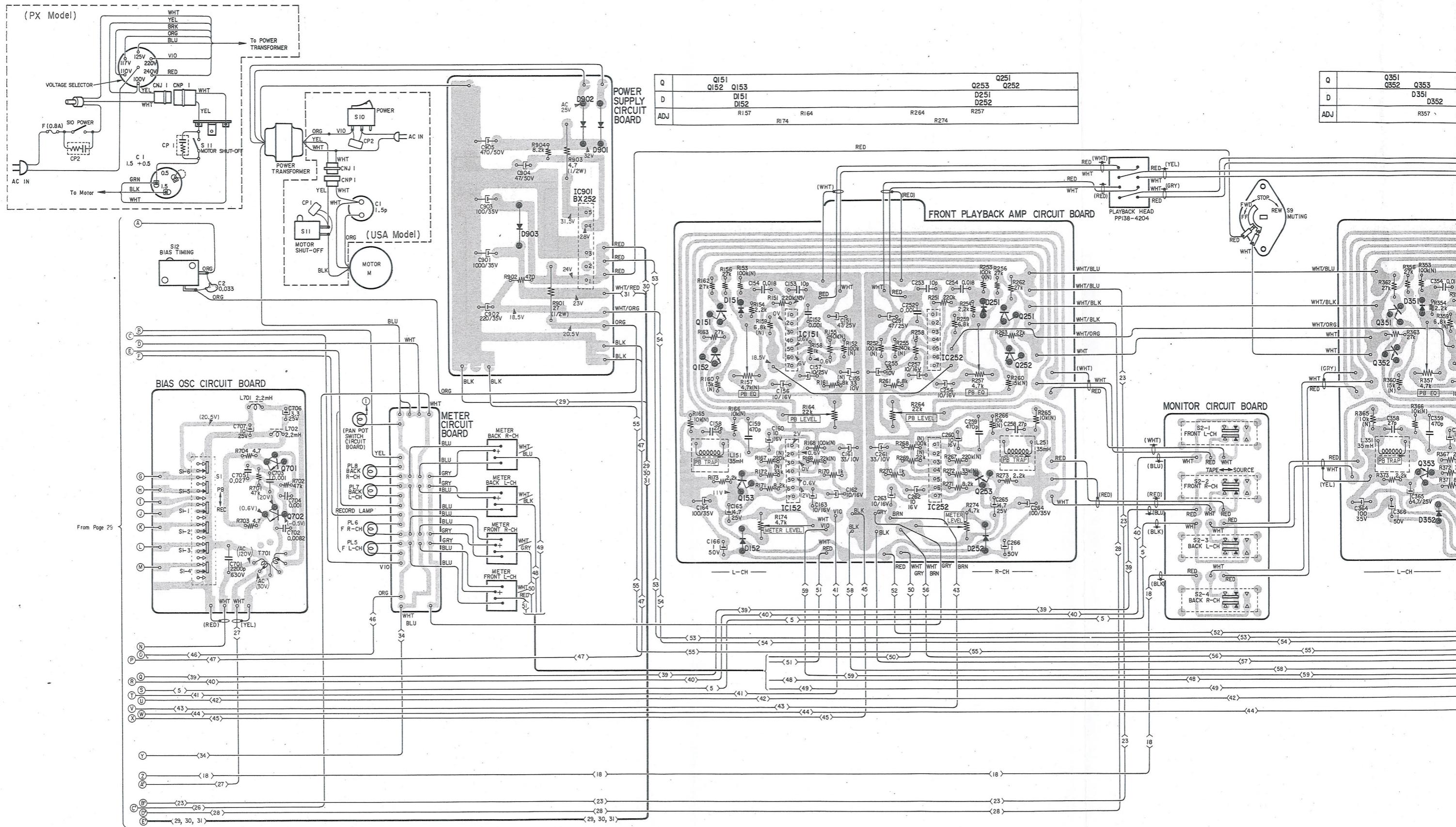
— Conductor Side —



1301	0304 0305	0302 0303
R323	L303	L302

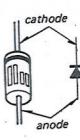
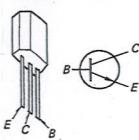
Q	Q202 Q203	Q204 Q205	Q201	Q101	Q104 Q105	Q102 Q105
D						
ADJ	R212	R223	R123		R145 R245	R345 R445





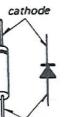
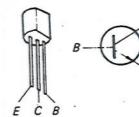
Q151, 251, 351, 451
 Q152, 252, 352, 452 } : 2SC634A
 Q153, 253, 353, 453

D901
 D902 } : SIB01-02
 D903

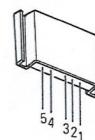


Q701, 702: 2SC1475

D151, 251, 351, 451
 D152, 252, 352, 452 } : 1T22

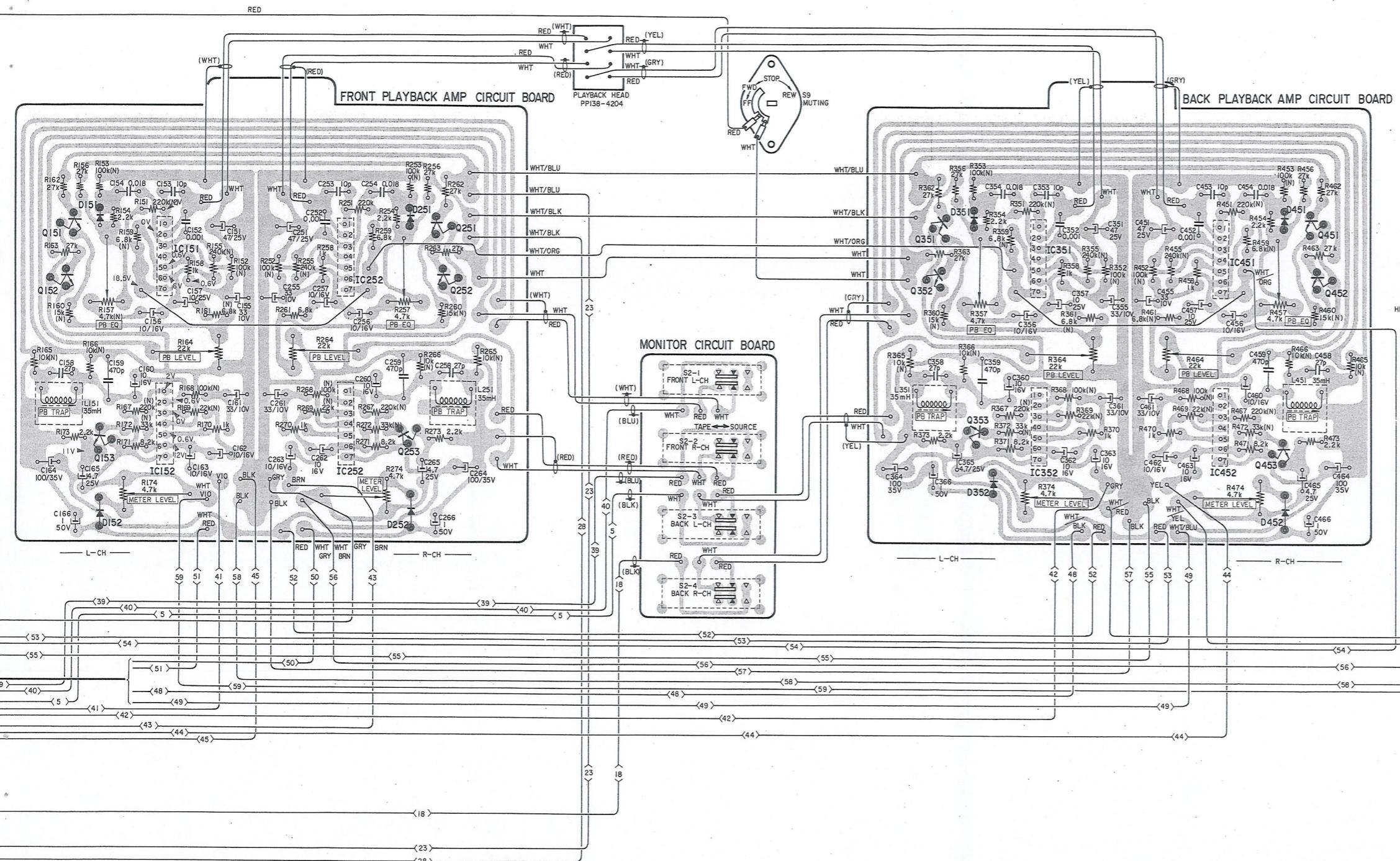


IC901: BX-252



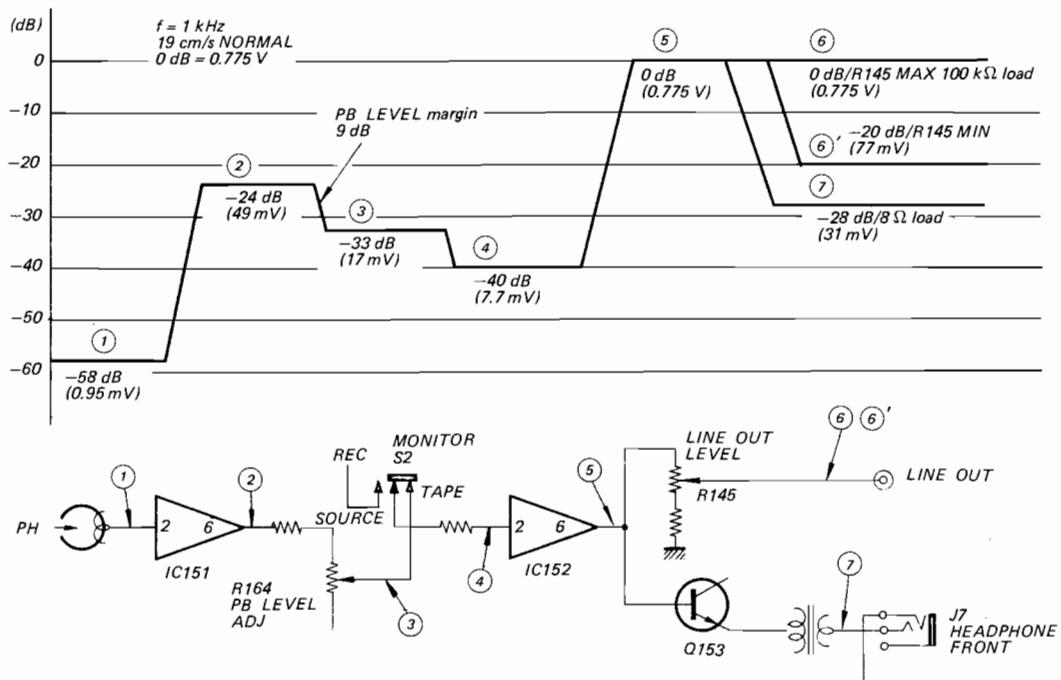
Q	Q151 Q152 Q153	Q251 Q252
D	D151 D152	D251 D252
ADJ	R157 R174	R264 R274

Q	Q351 Q352	Q353	Q451 Q452
D	D351 D352	D352	D451 D452
ADJ	R357 R374	R364 R374	R464 R474

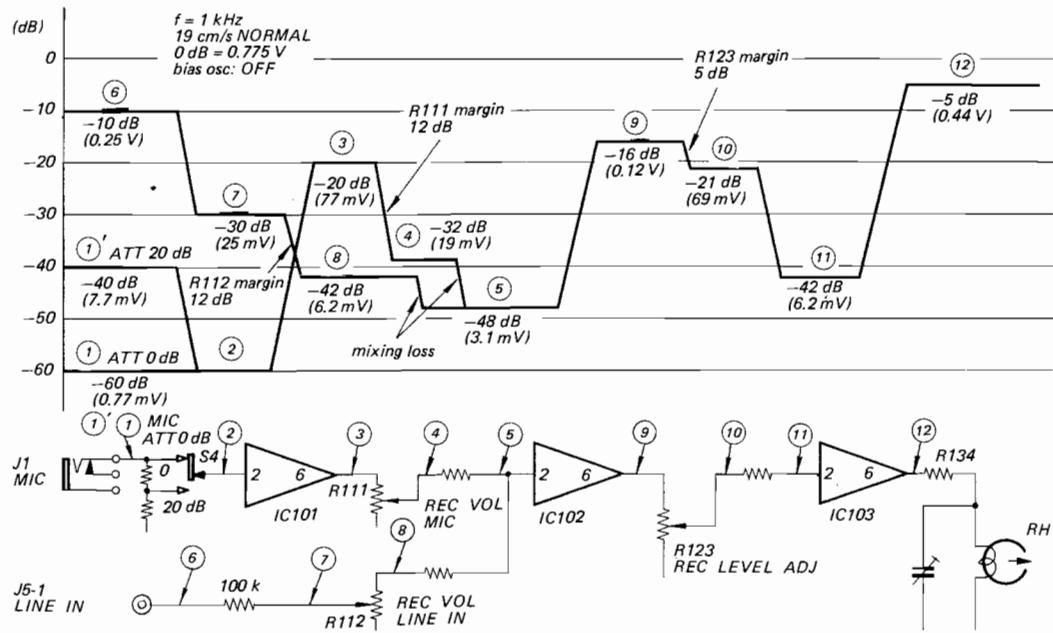


4-3. LEVEL DIAGRAMS

Playback



Record



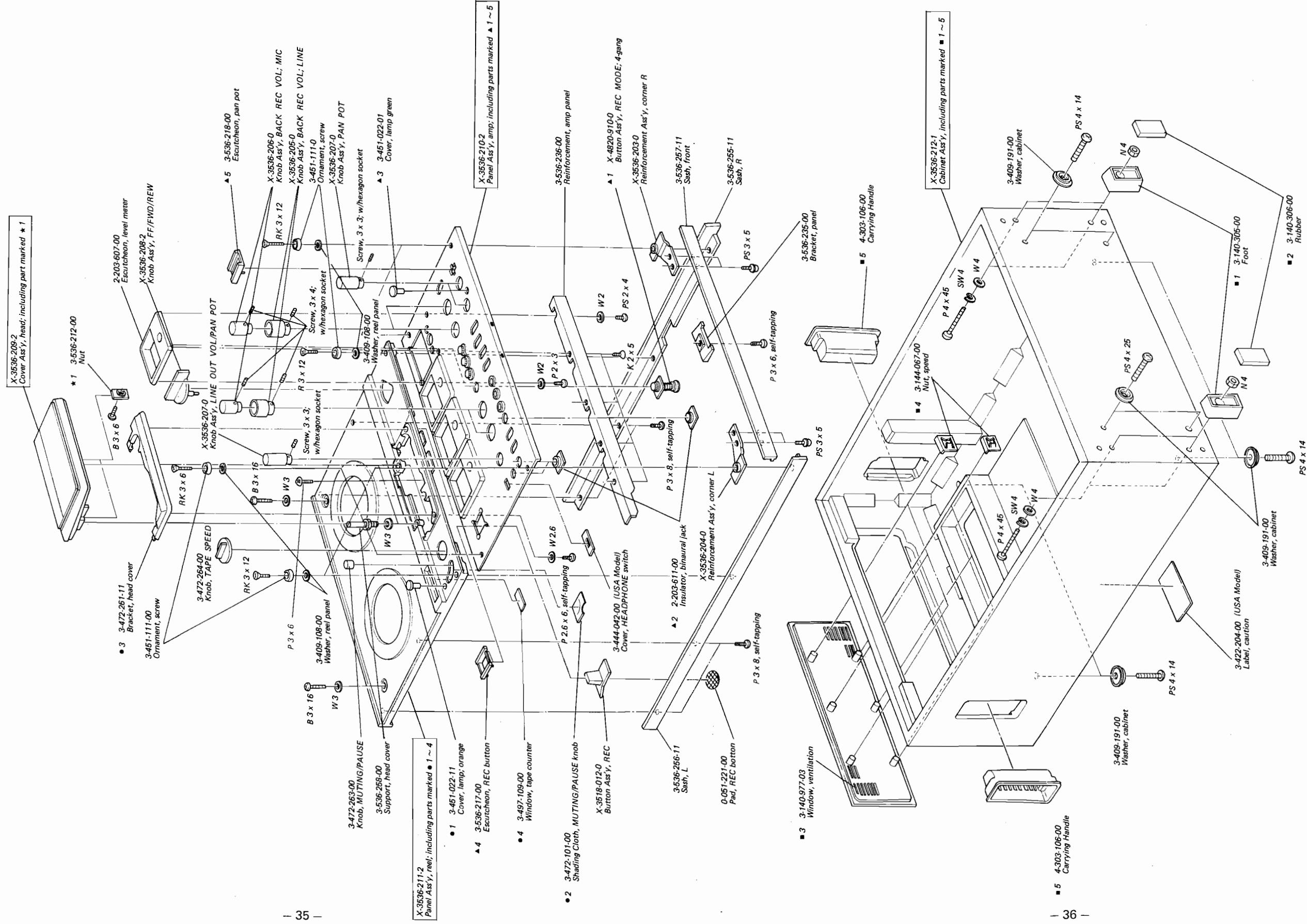
TC-388-4

MEMO

SECTION 5

EXPLODED VIEWS

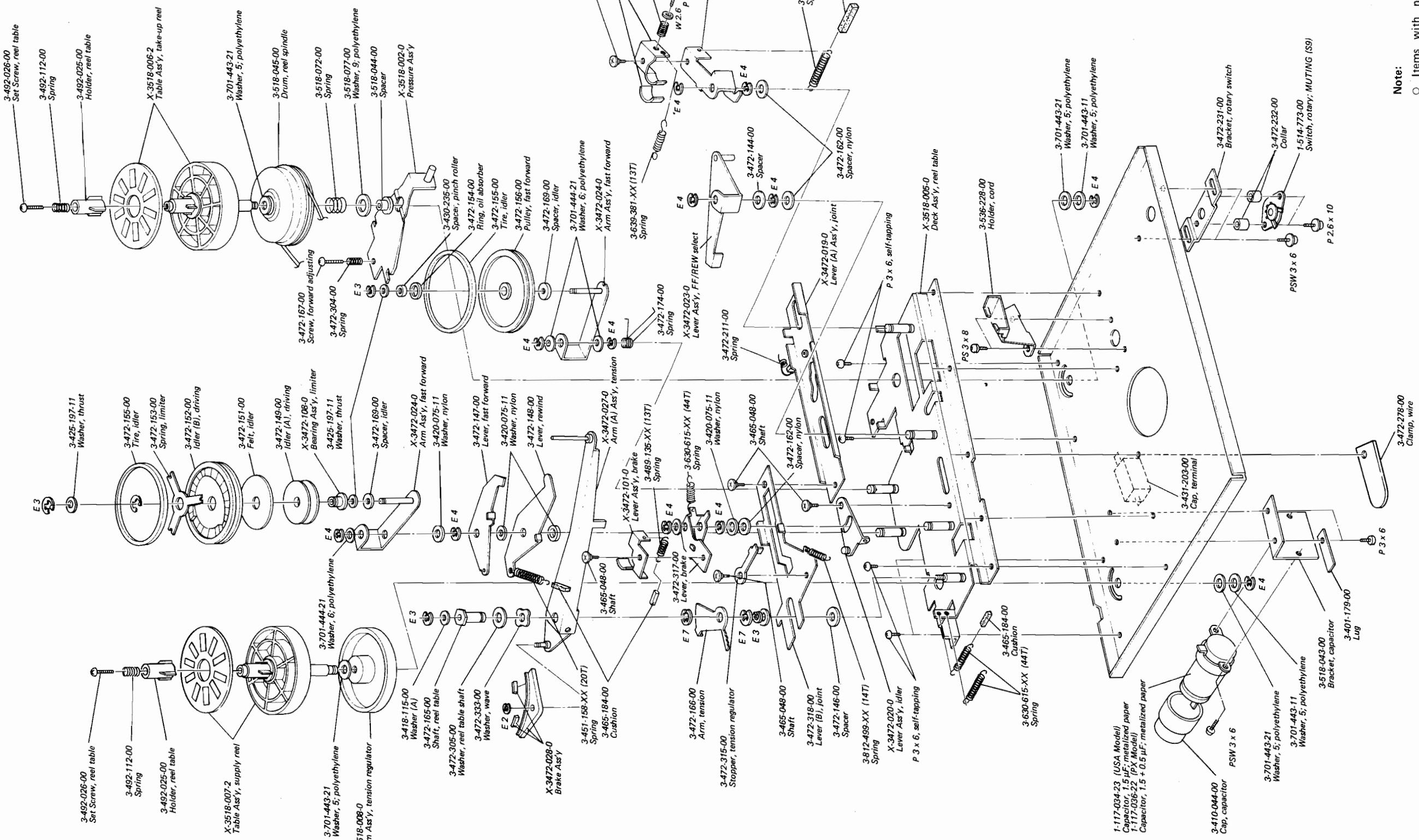
5-1. EXPLODED VIEW (1)



Note: Items with no part number and/or no description are not stocked because they are seldom required for routine service. All screws are Phillips (cross recess) type unless otherwise noted.
(-) = slotted head

TC-388-4 **TC-388-4**

5-2. EXPLODED VIEW (2)



1-11-034-23 (USA Model)
Capacitor, 1.5 μ F; metalized paper
1-11-036-22 (PX Model)

Capacitor, $1.5 \pm 0.5 \mu F$; metallized paper

10

241000

PSW 3 x 6
Cap. capacitor

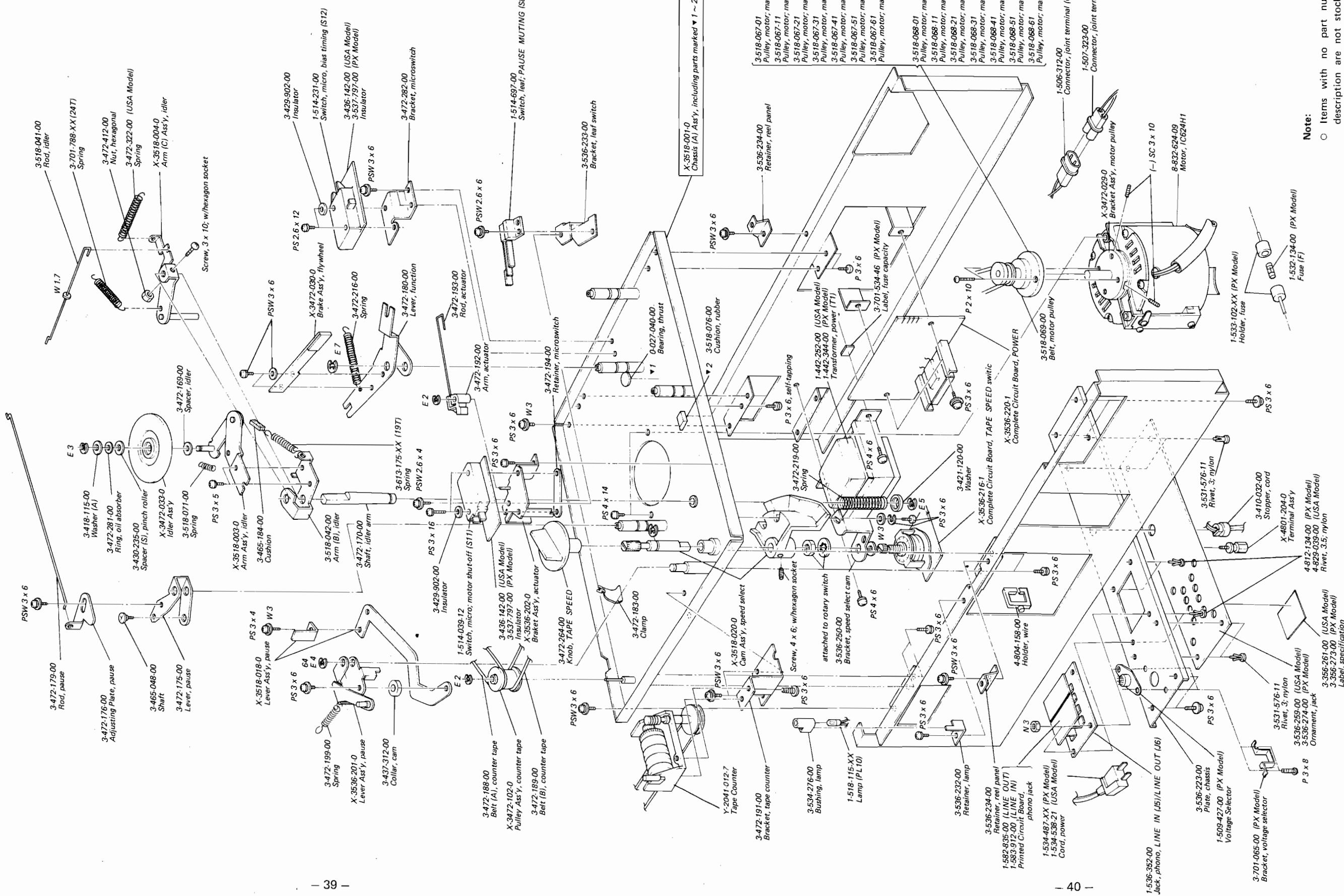
3-701-443-21
Washer, 5; polyethylene

3-701-443-11
Washer, 5; po

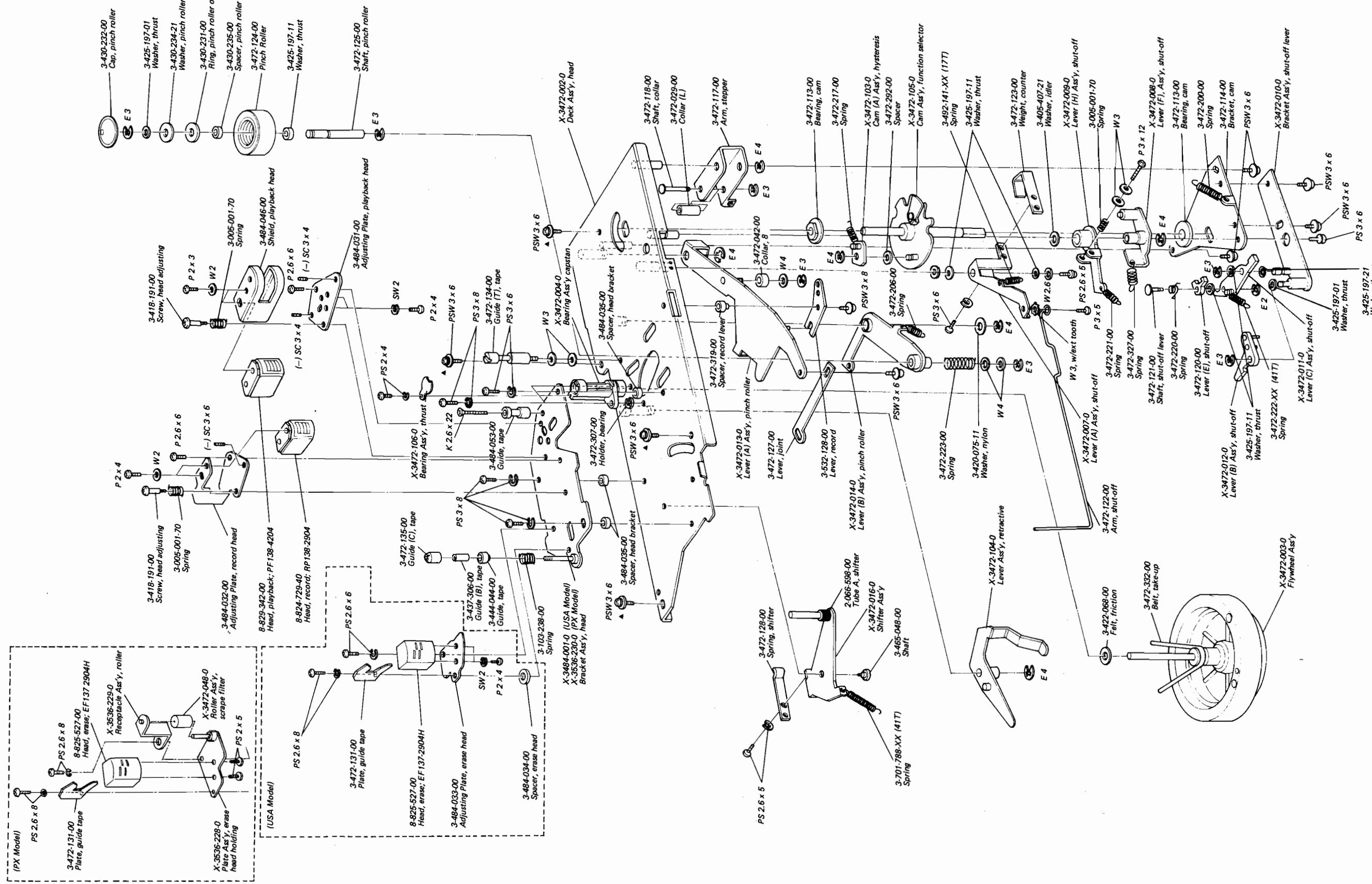
Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
 - All screws are Phillips (cross recess) type unless otherwise noted.
(-) = slotted head
 - (□□T) shows the number of coils in spring.

5-3. EXPLODED VIEW (3)



5-4. EXPLODED VIEW (4)



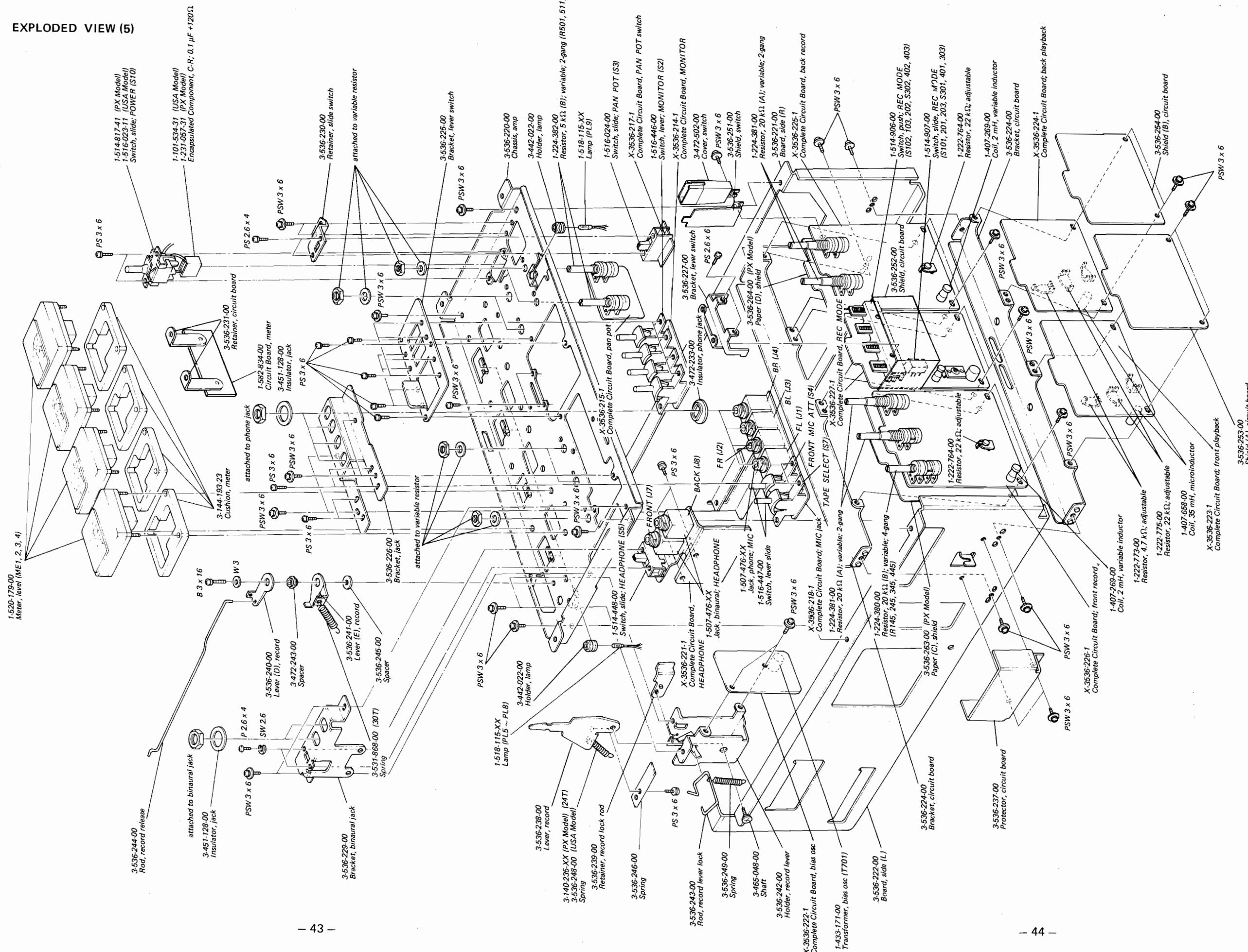
Note:

- Hardware.**

 - Items with no part number and/or no description are not stocked because they are seldom required for routine service.
 - All screws are Phillips (cross recess) type unless otherwise noted.
 (-) = slotted head
 - (□□T) shows the number of coils in spring.

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5-5. EXPLODED VIEW (5)



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
 - All screws are Phillips (cross recess) type unless otherwise noted.
(-) = slotted head

SECTION 6

PARTS LIST

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
COMPLETE CIRCUIT BOARDS												
X-3536-214-1	MONITOR	IC103, 203)	Integrated Circuit	TA-7122AP		CAPACITORS			C117, 217)	1-121-402-11	33 10 V elect	
X-3536-215-1	Pan pot	IC303, 403)				All capacitors are in μF unless otherwise indicated. $p = \mu\text{F}$ elect = electrolytic			C317, 417)			
X-3536-216-1	TAPE SPEED switch	IC151, 251)	Integrated Circuit	TA-7122AP		C1	1-117-034-23	1.5	metalized paper (USA Model)	C118, 218)	1-121-651-11	10 16 V elect
X-3536-217-1	PAN POT switch	IC351, 451)				C1	1-117-036-22	1.5 + 0.5	metalized paper (PX Model)	C318, 418)	1-121-651-11	10 50 V elect
X-3536-218-1	MIC jack	IC152, 252)	Integrated Circuit	TA-7122AP		C2	1-105-759-12	0.033	200 V mylar	C119, 219)	1-121-651-11	10 50 V elect
		IC352, 452)				C101, 201)	1-101-455-11	0.001	50 V ceramic	C319, 419)	1-105-508-12	0.0039 50 V mylar
X-3536-220-1	Power supply	IC901	Integrated Circuit	BX-252		C102, 202)	1-121-651-11	10	16 V elect	C120, 220)		
X-3536-221-1	HEADPHONE	D151, 251)	Diode	1T22		C103, 203)	1-107-125-11	56 p	50 V silvered mica	C121, 221)	1-107-181-11	330 p 500 V silvered mica
X-3536-222-1	Bias Osc	D351, 451)				C104, 204)	1-I07-123-11	47 p	50 V silvered mica	C321, 421)		
X-3536-223-1	Front Playback	D152, 252)	Diode	1T22		C105, 205)	1-121-402-11	33	10 V elect	C122, 222)	1-105-519-12	0.033 50 V mylar
X-3536-224-1	Back Playback	D352, 452)				C106, 206)	1-121-651-11	10	16 V elect	C323, 423)	1-105-518-12	0.027 50 V mylar
X-3536-225-1	Back Record	D801	Diode	1S2076		C107, 207)	1-121-651-11	10	16 V elect	C124, 224)	1-105-518-12	0.027 50 V mylar
X-3536-226-1	Front Record	D901	Diode	SIB01-02		C108, 208)	1-121-726-11	0.47	50 V elect	C324, 424)		
X-3536-227-1	REC MODE	D902	Diode	SIB01-02		C109, 209)	1-107-125-11	56 p	50 V silvered mica	C125, 225)	1-105-515-121	0.015 50 V mylar
		D903	Diode	SIB01-02		C110, 210)	1-107-123-11	47 p	50 V silvered mica	C325, 425)		
PRINTED CIRCUIT BOARD												
1-582-835-00	Printed Circuit Board, phono jack	L101, 201)	COILS	L101, 201)	8 μH , microinductor	C111, 211)	1-121-419-11	220	6.3 V elect	C151, 251)	1-121-410-11	47 25 V elect
1-582-912-00	Printed Circuit Board, phono jack	L301, 401)	1-407-519-00	L301, 401)		C112, 212)	1-121-409-11	47	16 V elect	C351, 451)		
1-582-834-00	Meter	L102, 202)	1-407-269-00	L302, 402)	2 mH, variable inductor	C113, 213)	1-121-748-11	10	25 V elect	C152, 252)	1-105-821-12	0.001 50 V mylar
		L103, 203)	1-407-269-00	L303, 403)	2 mH, variable inductor	C114, 214)	1-131-236-21	1	25 V tantalum	C352, 452)		
		Transistor	2SC634A	L151, 251)	35 mH, microinductor	C115, 215)	1-121-651-11	10	16 V elect	C153, 253)	1-107-107-11	10 p 50 V silvered mica
		Transistor	2SC634A	L351, 451)	1-407-658-00	C116, 216)	1-107-107-11	10 p	50 V silvered mica	C353, 453)		
		Transistor	2SC634A	L601	1-407-268-00	C311, 411)	1-121-419-11	220	6.3 V elect	C154, 254)	1-105-516-12	0.018 50 V mylar
		Transistor	2SC634A	L602	1-407-268-00	C312, 412)	1-121-409-11	47	16 V elect	C354, 454)		
		Transistor	2SC634A	L603	1-407-268-00	C313, 413)	1-121-748-11	10	25 V elect	C155, 255)	1-121-402-11	33 10 V elect
		Transistor	2SC634A	L604	1-407-268-00	C314, 414)	1-131-236-21	1	25 V tantalum	C355, 455)		
		Transistor	2SC634A	L605	1-407-268-00	C315, 415)	1-121-651-11	10	16 V elect	C156, 256)	1-121-651-11	10 16 V elect
		Transistor	2SC634A	L606	1-407-268-00	C316, 416)	1-107-107-11	10 p	50 V silvered mica	C356, 456)		
		Transistor	2SC634A	L607	1-407-268-00					C157, 257)	1-121-748-11	10 25 V elect
		Transistor	2SC634A	L608	1-407-268-00					C357, 457)		
		Transistor	2SC634A	L701	1-407-198-21					C158, 258)	1-107-071-11	27 p 50 V silvered mica
		Transistor	2SC634A	L702	1-407-198-21					C358, 458)		
		TRANSFORMERS										
		Transistor	2SC1475	T1	1-442-252-00					C159, 259)	1-107-234-11	470 p 50 V silvered mica
		Transistor	2SC1475	T1	1-442-344-00					C359, 459)		
		Transistor	2SC634A	T701	1-443-171-00					C160, 260)	1-121-651-11	10 16 V elect
		Integrated Circuit	TA-7122AP							C360, 460)		
		Integrated Circuit	TA-7122AP	T1001	1-427-270-00					C161, 261)	1-121-402-11	33 10 V elect
				T1004	1-427-270-XX					C361, 461)		
										C162, 262)	1-121-651-11	10 16 V elect
										C362, 462)		

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>				<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>			
C163, 263 C363, 463	) 1-121-651-11	10	16 V	elect							
C164, 264 C364, 464	) 1-121-357-11	100	35 V	elect							
C165, 265 C365, 465	) 1-121-395-11	4.7	25 V	elect							
C166, 266 C366, 466	) 1-121-391-11	1	50 V	elect							
C601	1-107-171-11	120 p	500 V	silvered mica			R111, 211	) 1-224-381-00	20 k (A), variable; 2-gang		
C602	1-107-171-11	120 p	500 V	silvered mica			R311, 411				
C603	1-107-165-11	56 p	500 V	silvered mica			R112, 212	) 1-224-381-00	20 k (A), variable; 2-gang		
C604	1-107-165-11	56 p	500 V	silvered mica			R312, 412				
C605	1-107-183-11	390 p	500 V	silvered mica			R123, 223	) 1-222-764-00	22 k, adjustable		
C606	1-107-183-11	390 p	500 V	silvered mica			R322, 422				
C607	1-107-183-11	390 p	500 V	silvered mica			R145, 245	) 1-224-380-00	20 k (B), variable; 4-gang		
C608	1-107-183-11	390 p	500 V	silvered mica			R345, 445				
C609	1-141-069-00	20 p ~ 120 p		trimmer			R157, 257	) 1-222-773-00	4.7 k, adjustable		
C610	1-141-069-00	20 p ~ 120 p		trimmer			R357, 457				
C611	1-141-069-00	20 p ~ 120 p		trimmer			R164, 264	) 1-222-775-00	22 k, adjustable		
C612	1-141-069-00	20 p ~ 120 p		trimmer			R364, 464				
C701	1-129-706-11	2200 p	630 V	polypropylene			R174, 274	) 1-222-773-00	4.7 k, adjustable		
C702	1-105-512-12	0.0082	50 V	mylar			R374, 474				
C703	1-105-501-12	0.001	50 V	mylar			R501, 511	) 1-224-382-00	5 k (B), variable; 2-gang		
C704	1-105-501-12	0.001	50 V	mylar			R504, 514	) 1-224-382-00	5 k (B), variable; 2-gang		
C705	1-105-518-12	0.027	50 V	mylar			R901	1-244-835-11	27	½ W	
C706	1-121-392-11	3.3	25 V	elect			R903	1-244-817-11	4.7	½ W	
C707	1-121-398-11	10	25 V	elect							
C801	1-121-414-11	100	10 V	elect							
C802	1-121-420-11	220	10 V	elect							
C803	1-129-706-11	2200 p	630 V	polypropylene							
C901	1-121-388-11	1000	35 V	elect							
C902	1-121-261-11	220	35 V	elect							
C903	1-121-388-11	1000	35 V	elect							
C904	1-121-411-11	47	50 V	elect							
C905	1-121-810-11	470	50 V	elect							

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
S11	1-514-039-12	Micro, motor shout-off
S12	1-514-231-00	Micro, bias timing
S101, 201 S203, 301 S401, 303 S102, 103 S202, 302 S402, 403	1-514-907-00	Slide, REC MODE
	1-514-906-00	Push, REC MODE

JACKS

J1	1-507-476-XX	Phone, MIC; front L
J2	1-507-476-XX	Phone, MIC; front R
J3	1-507-476-XX	Phone, MIC; back L
J4	1-507-476-XX	Phone, MIC; back R
J5	1-536-352-00	Phono, LINE IN
J6	1-536-352-00	Phono, LINE OUT
J7	1-507-476-XX	Binaural, HEADPHONE, front
J8	1-507-476-XX	Binaural, HEADPHONE, back

MISCELLANEOUS

CNP1	1-506-312-00	Connector, joint terminal
CNJ1	1-507-323-00	Connector, joint terminal
CP1	1-101-534-31 1-231-057-31	Encapsulated Component, C-R; 0.1 μ F + 120 Ω (USA Model) Encapsulated Component, C-R; 0.1 μ F + 120 Ω (PX Model)
CP2	1-101-534-31 1-231-057-31	Encapsulated Component, C-R; 0.1 μ F + 120 Ω (USA Model) Encapsulated Component, C-R; 0.1 μ F + 120 Ω (PX Model)
F	1-532-134-00	Fuse (PX Model)
M	8-832-624-09	Motor, IC624H1
ME1	1-520-179-00	Meter, level
ME2	1-520-179-00	Meter, level

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
ME3	1-520-179-00	Meter, level
ME4	1-520-179-00	Meter, level
PL1 PL2 PL3 PL4		Included in ME 1, 2, 3, 4
PL5	1-518-115-XX	Lamp, record; FL
PL6	1-518-115-XX	Lamp, record; FR
PL7	1-518-115-XX	Lamp, record; BL
PL8	1-518-115-XX	Lamp, record; BR
PL9	1-518-115-XX	Lamp, pan pot
PL10	1-518-115-XX	Lamp, pause muting
	1-509-427-00	Voltage Selector (PX Model)
	1-533-102-XX	Holder, fuse (PX Model)
	1-534-487-XX	Cord, power (PX Model)
	1-534-538-21	Cord, power (USA Model)
	1-536-376-00	Terminal strip; 1L1
	8-824-729-40	Head, record; RP138-2904
	8-825-527-00	Head, erase; EF137-2904H
	8-829-342-40	Head, playback; PP138-4204

ACCESSORIES

<u>Part No.</u>	<u>Description</u>
X-2440-015-0	Reel Ass'y, R-7ES (USA Model)
X-2440-015-1	Reel Ass'y, R-7ES (PX Model)
X-3701-018-2	Tips Ass'y, cleaning (PX Model)
1-534-049-31	Cord, connection (RK-74) (USA Model)
1-534-049-51	Cord, connection (RK-74) (PX Model)
3-401-193-00	Cleaning Ribbon (USA Model)
3-518-067-01 ~ 61	Pulley, motor (PX Model)
3-518-068-01 ~ 61	Pulley, motor
3-780-340-21	Manual, instruction (USA Model)
3-780-340-61	Manual, instruction (PX Model)
8-918-222-11	Tape, demonstration; DSE-4721

SECTION 7

HARDWARE

<u>Part No.</u>	<u>Description</u>	<u>Part No.</u>	<u>Description</u>
SCREWS			
	All screws are Phillips type (cross recess type) unless otherwise indicated.	7-682-950-01	PSW 3 x 12
7-621-259-45	P 2.6 x 6	7-683-140-20	3 x 6, cone point
7-621-259-55	P 2.6 x 8	7-683-141-21	3 x 8, cone point
7-621-259-65	P 2.6 x 10	7-683-237-31	3 x 3, hexagon socket
7-621-560-22	K 2.6 x 22	7-683-238-31	3 x 4, hexagon socket
7-621-729-79	P 2.6 x 6, self-tapping	7-683-242-31	3 x 10, cone point
		7-685-145-31	P 3 x 6, self-tapping
		7-685-146-21	P 3 x 8, self-tapping
WASHERS			
7-628-154-15	PS 2.6 x 6	7-623-104-11	1.7 (middle)
7-628-254-05	PS 2.6 x 5	7-623-107-05	2.6 (small)
7-682-123-01	P 2 x 3	7-623-107-18	2.6
7-682-146-01	P 3 x 5	7-623-107-19	2.6 (middle)
7-682-150-01	P 3 x 12	7-623-108-08	3 (small)
7-682-171-01	P 4 x 45	7-623-108-09	3 (small)
7-682-253-92	P 2.6 x 4	7-623-108-11	3 (middle)
7-682-254-32	P 2.6 x 10	7-623-108-21	3 (large)
7-682-347-04	RK 3 x 6	7-623-110-08	4 (small)
7-682-350-04	RK 3 x 12	7-623-110-18	4 (middle)
7-682-547-05	B 3 x 6	7-623-408-01	3, w/ext. tooth
7-682-552-04	B 3 x 16		
7-682-624-01	PS 2 x 4		
7-682-626-01	PS 3 x 6		
7-682-645-01	PS 3 x 4		
7-682-646-01	PS 3 x 5	7-624-104-01	E2
7-682-647-01	PS 3 x 6	7-624-106-01	E3
7-682-648-01	PS 3 x 8	7-624-108-01	E4
7-682-652-01	PS 3 x 16	7-624-109-01	E5
7-682-660-01	PS 4 x 6	7-624-111-01	E7
7-682-667-01	PS 4 x 25	7-624-112-01	E8
7-682-947-01	PSW 3 x 6	7-623-508-01	Lug, 3
7-682-948-01	PSW 3 x 6		

Hardware Nomenclature

P - Pan Head Screw		SC - Set Screw	
PS - Pan Head Screw with Spring Washer		E - Retaining Ring (E Washer)	
K - Flat Countersunk Head Screw		W - Washer	
B - Binding Head Screw		SW - Spring Washer	
RK - Oval Countersunk Head Screw		LW - Lock Washer	
T - Truss Head Screw		N - Nut	
R - Round Head Screw			
F - Flat Fillister Head Screw			
- Example -			
P 3 x 10			
Length in mm (L)		Diameter in mm (D)	
Type of Head		Type of Head	

C-388-4

9-954-180-02

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